E READING
EADING

The Farm

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DETROIT

QUARTERLY, FALL 1952, FIFTY CENTS

Is Artificial Insemination a Flop?

Krilium for Farm Use

How to Make Cheese

CLAIMS WON'T DO YOUR WORK!

Lots of claims are being made to convince you that this, that or the other tractor tire will give you greater traction, clean better, and get your work done faster.

But claims won't do your work for you. What you want is down-to-earth facts—based on the experience of farmers who have tried and tested all makes of tractor tires under all kinds of soil and weather conditions.

So remember this: *farmers* across the country, in survey after survey, vote Goodyear's time-proved Super-Sure-Grips their *First Choice* tractor tires by a huge margin—*with no close second!* There you have solid facts, not empty words to guide you.

For this overwhelming vote is proof positive that farmers like yourself—men who *use* tractor tires every day—have learned in the fields that Super-Sure Grips pull where other tires won't—that Goodyears clean better and last longer. That's real experience talking!

Doesn't it make good sense, then, to get Goodyears on *your* tractor—especially since they cost no more?

FIRST in Traction ***FIRST in Long Wear*** ***FIRST in Popularity***

GOODYEAR

Super-Sure-Grip Tractor Tires

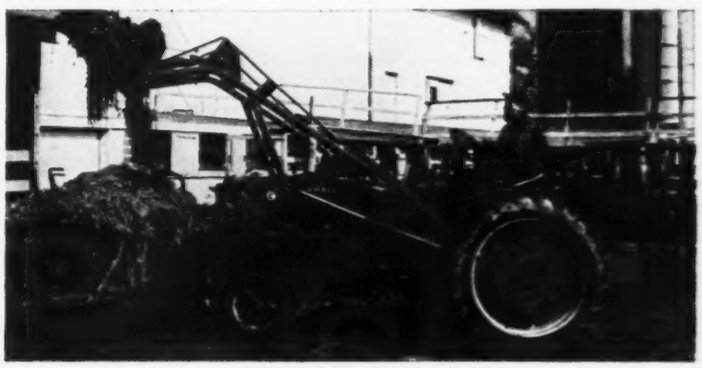
Super-Sure-Grip—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

Test Super C pull-power for plowing with a McCormick quick-connect two-furrow plow. Ask your IH dealer to show you how the McCormick Farmall Super C gives you sure-pulling traction to plow 8 to 10 acres a day, save up to 25% on fuel.

YOUR IH DEALER INVITES YOU TO PROVE TO YOURSELF

You get more pull-power with a McCormick® FARMALL® Super C!

Prove you can double-disk up to 28 acres a day with a Super C and McCormick disk harrow. Your IH dealer will be glad to let you try the Super C. Try hydraulic Remote-Control of the disk gangs. See how the big steering wheel, double-disc brakes, and swinging drawbar help you turn short in loose soil.



See how fast and easily you can load manure with a front-mounted loader and a Farmall Super C. Your IH dealer invites you to try the Super C yourself—to find out how *continuous* two-way hydraulic Farmall Touch-Control lifts and lowers the load *fast*, to save time and work.

PROVE TO YOURSELF that the Super C is the *champion of its power class.* Test its pull-power, ease of operation and fuel economy with any of its matched McCormick implements. See your IH dealer now for a free demonstration! You can buy on the Income Purchase Plan and let the Super C pay for itself in use.

INTERNATIONAL HARVESTER

International Harvester products pay for themselves in use—McCormick Farm Equipment and Farmall Tractors . . . Motor Trucks . . . Crawler Tractors and Power Units . . . Refrigerators and Freezers—General Office, Chicago 1, Illinois

NOW!

The Replacement for Sow's Milk that's

Practical for Farm Use!

SPARX

DRY OR CONDENSED

With ANTIBIOTIC and B_{12}

SPARX now available in dry and condensed form, makes it safe and practical for you to take pigs from the sow at *any age!* Gives you the wonderful laboratory results you've heard about right on your own farm—without special equipment . . . at low cost . . . with little extra work!

Start your pigs on Dry Sparx, especially made for very young pigs, anytime that sow's milk is lacking from the 2nd day up to the 4th week. Use Condensed Sparx from the 4th week to supplement sow's milk before weaning, replace it after weaning to avoid weaning setbacks. Sparx can help you save extra pigs—even entire litters—wean them up to 50% heavier than the national average, have 75 to 90 lb. shoats in 90 days! Get a box, drum or barrel of Sparx from your feed dealer today. Complete feeding directions and measuring cup in each box. Save more Fall pigs to boost your hog profits!

Practical and Profitable to Feed at Any Age!

NO SPECIAL EQUIPMENT NEEDED!

This litter was removed from the sow on the 2nd day. When they had their picture taken on the 10th day, they weighed 8 lbs. By usual weaning time (8 weeks), they had grown to a strapping 47½ lbs.! Proof positive that you can raise a litter of pigs without the sow, save orphan pigs and runts from over-size litters!

Don't want to waste your sow's milk? Then keep your normal litters with the sow to the second or third week and then start Dry Sparx. Sows hold weight, gilts continue growing and can be bred third week after farrowing. This litter put on Dry Sparx at 10 days, weighed in at 387 lbs. at 8 weeks.

This is the age to switch pigs to condensed Sparx (whether raised on sow's milk or dry Sparx). Recommended especially for big litters, late pigs, or for early weaning to re-breed on 2-litter schedule. This 4-week litter more than doubled their weight in the next 4 weeks without a weaning setback!

©1952 CONSOLIDATED PRODUCTS CO., DANVILLE, ILLINOIS *Division Offices:* Princeton, N. J., Des Moines, Ia., Sacramento, Calif. *Makers of* Semi-Solid Buttermilk, Semi-Solid Emulsions and Kaff-A.

ANNOUNCING
THE WORLD'S GREATEST FARM TIRE VALUE!

THE New Firestone

GROUND GRIP OPEN CENTER TRACTOR TIRE

Now Only

74.20

Plus Tax

Size 10–38

Other Sizes Proportionately Low

And here's why you get more for your money with these tires:

- **Two extra tread plies give extra protection against impact breaks.**
- **Flared tread openings insure positive flexing and cleaning in all types of soil . . . won't plug at shoulders.**
- **Double-thick tread base at center bar ends eliminates possibility of bar ends punching through body.**
- **Tapered bar construction gives a sharp bite at center and maximum penetration at shoulder for greater traction.**

Let your nearby Firestone Dealer or Store show you all the many other work-saving, money-saving advantages of this amazing new tractor tire. Compare before you buy . . . no other tractor tire gives so much for so low a price.

Always Buy Tires Built by FIRESTONE, Originator of the First Practical Pneumatic Tractor Tire

Enjoy the Voice of Firestone on radio or television every Monday evening over NBC

Copyright, 1952, The Firestone Tire & Rubber Co.

Meet These ALL-NEW Tractors

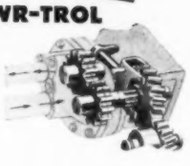
JOHN DEERE
MODELS "50" AND "60"
JOHN DEERE QUALITY FARM EQUIPMENT

They Step Up Performance in All These NEW Ways

In their livelier, more flexible power . . . their new, "live" power shaft and "live" Powr-Trol . . . their effortless steering . . . quick-change wheel tread, and many other major engineering advancements and improvements, these heavy-duty 2- and 3-plow John Deere "50" and "60" Tractors step up performance in many new ways. See your John Deere dealer and arrange to drive one of these great new tractors in the field.

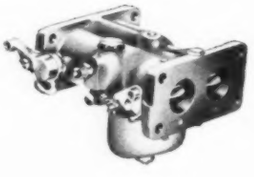
"LIVE" HIGH-PRESSURE POWR-TROL

Provides ever-ready hydraulic power—independent of both transmission and power shaft—for faster effortless equipment control. Direct engine-driven high-speed pump increases lifting capacities as much as 114% over previous models.



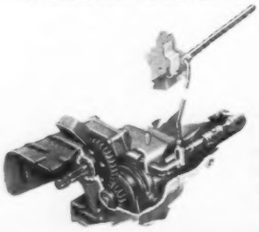
DUPLEX CARBURETION

This new *double-barreled* carburetor meters fuel in identical amounts to each cylinder giving you more "get-up-and-go" . . . outstanding fuel economy . . . smoother engine performance . . . faster cold-weather starts.



QUICK-CHANGE WHEEL TREAD

Makes re-spacing of tractor rear wheels a simple, easy, one-man job. No lifting, tugging or reversing wheels from side to side to obtain any tread from 56 to 88 inches.



"LIVE" POWER SHAFT

Operating independently of the transmission clutch, the "live" power shaft speeds up every PTO job . . . practically eliminates clogging of power-driven machines . . . saves cost of auxiliary engines in many cases.

EFFORTLESS STEERING

Highly-finished worm and full gear, increased gear ratio, one-joint construction and a ball thrust bearing at the pedestal base, combine to make the new Models "50" and "60" the easiest handling tractors you've ever known.

FREE BOOKLET
Fill Out and Mail This Coupon to
JOHN DEERE · Moline, Ill.

Please send free booklet on the New John Deere Models "50" and "60" Tractors.

Name_____

R.R._____ Box_____

Town_____ State_____

COMING IN WINTER

Is there any one spot in this country that is ideal for farming? The U. S. Weather Bureau Climate Reports indicate that there is nothing that can touch Grant's Pass, Oregon. Boosters for the desert say that in the Columbia River Basin, with ideal growing conditions for nine months of the year and plenty of irrigation water, you can grow twice as much, of any crop.

How would you like to farm with 20 feet of top soil? In our Winter issue we will take you to the Peace River Valley of Alberta, Canada. Here they grow fabulous crops of grain, and "fertilizer" is a word that has a far-off ring.

If you have had your milking delayed when a winter icestorm cut off your power or tried to figure out how you were going to keep your milk cool when a summer thunderstorm stopped your milk cooler, you will want to see how farmers have set up their own standby power plants. Farmers are increasingly dependent on electrical power to do their chores. A power failure is not only an inconvenience—it can cost a lot of money.

This is the time of year when the fat hogs are butchered and hams and bacon are cured and smoked. A complete article on meat-curing in the Winter issue will delight the farm housewife. Here a new technique is explained too. You can combine freezing and curing to get the best flavor and keeping qualities in your meats.

"How To Clear Land And Put It In Cultivation" is a subject that has interested many of our readers. Land clearing used to be just hand-blistering work. With modern equipment it is still work, but it goes faster. Here are the details for doing the job economically with modern equipment.

For dairymen there are articles on barn ventilation, using Vitamin A in dairy ration and bulk handling of milk.

There are a number of little-used pasture crops that can help farmers through the in-between periods when pasture is short. "The Second Team" tells about these fast-growing pasture grasses. Sudan grass, millet and a number of others are being used with success.

Are wild onions an unwanted crop on your farm? For the past twelve months, FARM QUARTERLY editors, with the cooperation of some of the leading spray manufacturers and custom spray men, have given the onions on several farms in the Midwest "the works". You *can* get rid of onions if you are willing to take the trouble.

There is also a delightful story on a Christmas specialty—mistletoe. Did you know you can raise it without supplying anything? All you need to do is harvest it and sell it. Girls do the rest.

Cooperative livestock pools, controlling foot rot, war on rats, remodeling farm buildings—are all subjects that fit into the winter picture on the farm.

THE FARM QUARTERLY
22 East Twelfth St., Cincinnati 10, Ohio

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Noel Martin.....Art Director
Edna O'Connell.....Editorial Secretary
Aron M. Mathieu.....Business Manager

Many southern farms are bordered by the beautiful, ever encroaching swamp.

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B.F.Goodrich

tires speed farm production at 14,000-acre Schramm Ranch

IN the early 1920's, Emil Schramm came out of the Nevada gold fields, started farming 30 acres near San Joaquin, Calif., with horses for power.

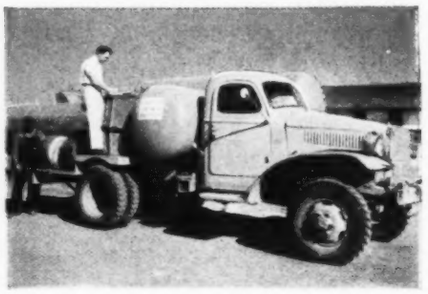
Today the Schramm Ranch is a 14,000-acre operation with more than 6,500 acres in cotton, 2,000 in small grain, 2,000 in alfalfa and thousands of acres in pasture land. Some 1,250 head of cattle are in pastures and feed lots.

This is irrigated farm land—and completely mechanized farming. For example, 59 tractors are in operation, 6 combines, a 4-wheel drive field service truck, 15 other trucks, ranch cars and a jeep.

For all this equipment they want tires that keep farm machinery rolling without lost time from tire failures. And the Schramm Ranch uses B. F. Goodrich tires exclusively.

Speaking of cotton pickers, for example, Donald Schramm says, "B. F. Goodrich Power-Curve tires licked a rugged traction problem on tractors operating backwards with much turning at row ends. They have to bring the pickers out of the fields over rough irrigation checks and road ditches, through wet and muddy spots."

These tires save time because they always give full shoulder-to-shoulder traction. This is the tire that outpulled other leading brands in test after test. That's because of the unusual open-center tread. Each curved cleat has a hard, arrowhead nose that bites into the soil. Because the braced cleats are evenly spaced from shoulder to shoulder, they take a firm grip. Dirt and mud drop out of the open channels as the tire rolls. Every turn of the wheel counts. You get maximum traction.



BFG All-Purpose tires give this truck extra traction when operating cross-country. Tread wears slowly on pavement.

You need full traction from tires when picking cotton. These tractors work faster with BFG Power-Curve tires.

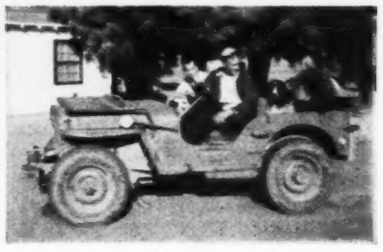
Note the arrowhead cleats of the Power-Curve tires on this butane tractor.

Schramm trucks and cars roll on BFG tires, too. For their trucks the All-Purpose farm tire is a popular one. This tire with its massive lug-type tread gives off-the-road traction while a riding bar down the center makes it a long-wearing highway tire. Like all BFG truck tires of 8 or more plies, it's protected against bruising by a nylon shock shield.

Tubeless Tires seal punctures—protect against blowouts

Three passenger cars are equipped with the new BFG Tubeless Tires for added safety of the family and farm operators. These cars travel over dirt and gravel roads, across fields, through deserts and mountains on both business and pleasure. And Tubeless Tires provide added safety every mile.

Take a tip from successful farm operators such as Schramm Ranch.



Don Schramm (in red sweater) ready to go duck hunting.

Whether your farm is large or small you can get the same time-saving, money-saving advantages and the added safety, too, of B. F. Goodrich tires. See your B. F. Goodrich retailer. You'll find his name in the yellow pages of the phone book under the heading "Tires". *The B. F. Goodrich Company, Akron, Ohio.*

RESEARCH KEEPS B.F.Goodrich FIRST IN RUBBER

Putting Pounds on Pigs *is part of our business, too!*

Pig raisers know that profits are not determined by guess work. It's weight that counts! And the *faster* a pig reaches market weight the greater the profit.

Each year Seagram produces thousands of tons of highly nutritious Seagram Solubles, rich in proteins, minerals, vitamins and other growth factors for use by feed dealers and mixers to balance the feeds they sell. For natural feeds alone seldom contain *all* of these vital growth ingredients.

The importance of enriched feeds has been proved in feeding tests by experimental stations the nation over. In making available this nutritional feed supplement, we are helping to put pounds on pigs faster, so that pig raisers can realize greater profits!

Joseph E. Seagram & Sons Inc., Louisville 1, Kentucky

Seagram SERVICE TO AGRICULTURE

"My truck runs for Only 2½¢ a mile"

says W. E. Worthen, Jr. of Highlands, Texas

"I have always used Ford Trucks because they can't be beat for all-round ranch work," says W. E. Worthen, Jr.

"Mucky rice fields and rough pasture never stop my faithful Ford Pickup! It sure can take it! The records I kept during the Economy Run show my Ford costs mighty little to run!

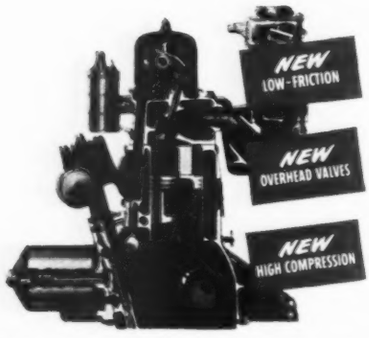
"In five months, my 1951 Ford F-1 covered 7,277 miles . . . much of it off-the-road. My total cost for gas, oil, maintenance and repairs was only $175.94, which averages out to a running cost of less than 2½ cents a mile."

Rancher and rice farmer W. E. Worthen, Jr. bought his first Ford Truck in 1941; now uses two Fords.

The famous Ford Pickup is but one of many models available. Up to the 155-h.p. BIG JOBS, there's a Ford Truck tailor-made for your particular hauling job.

Now! Up to 14% more Gas Savings

and more Speed Hauling power, too!



THIS new Ford 101-h.p. Cost Clipper Six passed, with flying colors, 2 years of economy and durability tests. It had 50,000 dynamometer test-hours, over 500,000 vehicle test miles.

New LOW-FRICTION design in 3 Ford Truck high-compression engines slashes friction loss!

There are important savings in store for you in new Ford LOW-FRICTION truck engine design. It cuts friction horsepower up to 30%! It saves gas! It gives you more Speed Hauling power!

Ford's LOW-FRICTION design includes many new features. A new Short-Stroke principle cuts piston travel up to 20%, which makes for longer engine life. New OVERHEAD-VALVES give more efficient fuel-feeding. New HIGH-COMPRESSION gives extra power on regular grade gasoline.

You can get new LOW-FRICTION design in 3 of the 5 great Ford Truck engines for '52. And you get more power than ever before in the famous 239 cu. in. TRUCK V-8 or 254 cu. in. BIG SIX. See what's new, at your Ford Dealer's.

Now 5 Great Truck Engines

New 101-h.p. Cost Clipper Six
Proved 106-h.p. Truck V-8
Proved 112-h.p. BIG SIX
New 145-h.p. Cargo King V-8
New 155-h.p. Cargo King V-8

Availability of equipment, accessories and trim as illustrated, is dependent on material supply conditions.

DON'T GUESS! See how little it can cost to run a truck in your kind of work. See the cost figures in this 144-page book showing results from the Ford Truck Economy Run. At your Ford Dealer's now!

FORD TRUCKING COSTS LESS and FORD TRUCKS LAST LONGER!

Using latest registration data on 8,069,000 trucks, life insurance experts prove Ford Trucks last longer!

"I am FEED POWER"

I bring you Record-Making Production –

of EGGS: *Feed Power* develops pullets *fast* for early, EXTRA EGGS . . . promotes sustained HEAVY LAYING . . . keeps your feed cost per dozen LOW. *Feed Power* is yours in all 3 ways of Wayne Feeding . . . All-Mash, Mash-Scratch, Concentrates—in Mash, Pellet or Krum form. Get going *now* for *all the eggs your hens can lay* . . . with amazing *Wayne Feed Power!*

of MILK: *Feed Power* stimulates HEAVY MILK FLOW, makes for LONG COW LIFE. Start *now* to get *all the milk your herd can give* . . . with the *Feed Power* of labor-saving Wayne Dairy Feeds and Supplements . . . tailor-made to fit in with your pasture and roughage supply. Remember too, the Wayne Way builds big, growthy calves and heifers at low cost . . . lets *you sell more milk!*

of PORK: *Feed Power* cuts your corn and farm grain requirements . . . grows and finishes out *top hogs* with minimum time, work, and feed. Start now to build each 100 LBS. OF PORK in record time . . . speed your hogs to early, HIGH markets . . . with the *power* of the special Wayne Hog Feed that fits your need—complete feeds, concentrates, supplements.

GIANT FEED POWER
CREATED FOR YOU BY WAYNE RESEARCH

. . . by scientifically blending and balancing Antibiotics, Vitamin B-12 and other high-potency, high-quality ingredients in correct, fortified proportions for amazing Feed Power! See your Wayne Dealer now!

WAYNE FEEDS

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ALLIED MILLS, INC. *Builders of* TOMORROW'S *Feeds* TODAY!

Executive Offices: Chicago 4, Ill. Service Offices: Ft. Wayne 1, Indiana

3 points to remember when you buy GRIT

1 WILL IT ATTRACT BIRDS' ATTENTION?

Grit that remains untouched in the hopper doesn't grind feed. That's why birds should be given a grit that attracts—that they *like* to eat. Tests show that STONEMO's black specks of mica glisten in the sunlight, attract birds. They choose and eat STONEMO *above all others!*

2 IS IT HARD AND INSOLUBLE?

Many so-called "grinding agents" are soft and soluble. They quickly dissolve when placed in a 0.3% solution of hydrochloric acid—the normal acid concentration found in a bird's stomach. Lime base grit, which dissolves, tends to neutralize this stomach acid—makes it more difficult for the bird to assimilate proteins.

3 HOW WELL WILL IT GRIND FEED?

It takes hard, rough, insoluble grit to grind feed. STONEMO with its sharp-cutting extra grinding surfaces does just that—it grinds feed fine. STONEMO helps make more of the valuable nutrients available for good growth —helps birds GRIND OUT MORE from every pound of feed—at less cost.

Remember, STONEMO Granite Grit gives you all three features: STONEMO attracts birds. They like it. STONEMO is hard and insoluble—and it really grinds feed fine for better utilization of nutrients.

Whether you raise broilers for meat — pullets for eggs — turkeys for fryers or full-grown weight, let STONEMO grind out more eggs and meat, help reduce feeding costs. Get the economy 80-lb. bag of STONEMO at your feed or poultry supply dealer.

FREE! Send for your STONEMO SELECTOR. Tells the proper size STONEMO for every stage of poultry growth and production: Chicks—Pullets —Broilers—Laying Hens—Turkeys. Address: Dept. FQ-A, Stone Mountain Grit Co., Inc., Lithonia, Ga.

STONEMO

The Grit with the EXTRA GRINDING SURFACES

Poultry Yard

Charcoal Robs Chicks The addition of two per cent charcoal to a normal baby chick ration played hob with experimental birds at the University of California. Professors H. J. Almquist and D. Zander were out to find whether or not charcoal had any value as chick feed. They divided some day-old chicks into two groups. Both got the same vitamin enriched feed, but one group had two per cent charcoal added to the ration. The birds on the normal ration did well, but the poor chicks which were fed charcoal ran into trouble.

Seventy-five per cent of the charcoal-fed birds showed deficiency of vitamin A, others suffered from deficiency of vitamin K (the substance which causes proper blood clotting), and many suffered from curled toe paralysis which comes from a lack of vitamin B_2 or G. In addition to this, all charcoal-fed birds ended the experiment with eroded gizzard linings.

The scientists decided that charcoal not only irritated the gizzard to the extent of wearing away part of it, but also kept the birds from getting the vitamins which they needed for normal growth. For years it has been thought that charcoal in the rations collects gasses, poisons, and other products which might injure the birds. This may be true, but charcoal also seems able to collect nutrients from the food and prevents the bird from making use of them.

How To Serve Oat Hulls Poultrymen who are beginning to lose a little hair worrying over the high price of feed may be saved from complete baldness by a recent announcement by research workers at the government experiment station at Beltsville that they have succeeded in developing a new, economical source of chicken feed. The research men have been able to feed laying hens pellets composed of 64 per cent oat hulls and only 36 per cent laying mash without causing a drop in production of eggs. Oddly enough, when the same mixture was fed without pelleting, egg production dropped to 25 per cent of normal. Now the scientists are starting new investigations to try and find out *why* pelleting changes the ability of the hen to consume fiberous material and, of course, what other material beside oat hulls might be used.

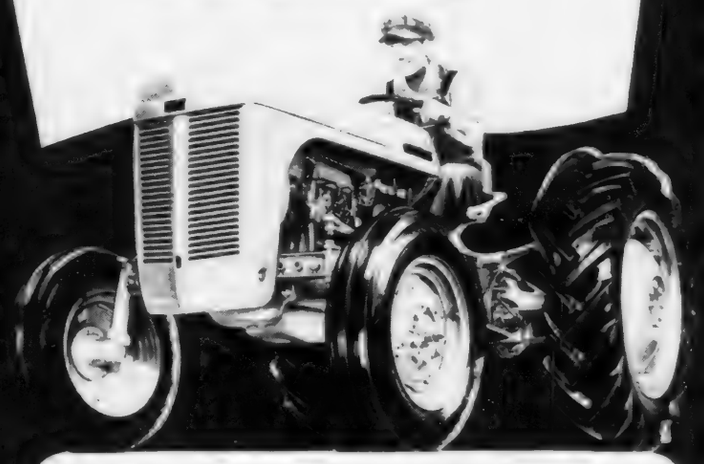
Hatching Cracked Eggs A method has been devised for patching up cracked eggs so that they can be hatched. Mrs. J. F. Liggett, a farm wife from Independence, Missouri, has patched and hatched the most contrary of all eggs to incubate, the goose egg. She patches a cracked egg as soon as it is gathered or even when it arrives by parcel post. Her method? Scotch tape.

Now...only the FAR MORE POWERFUL FERGUSON "30" can have the famous FERGUSON SYSTEM with

Exclusive **SSC*** SUCTION-SIDE CONTROL

BIGGER

★ in power
★ in performance
★ in economy



* As a result of the consent judgment in the recent settlement of the Ferguson vs. Ford lawsuit, Ferguson, and *only* Ferguson, can now have the famous Ferguson System. If you want the *advantages* of the Ferguson System, the Ferguson "30" is the only tractor that can give them to you.

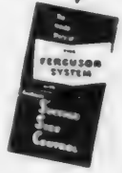
Remember this . . . the Ferguson System is far more than 3-point linkage. True, this linkage is a part of the Ferguson System that can be seen. But, the Ferguson System control center is *inside* the tractor, the very heart of the machine.

There are other tractors on the market that are and will be similar in *outward* appearance to the Ferguson. *Don't be fooled by these outward appearances!* A *vital* and *exclusive* feature of the Ferguson System—the hydraulic pump with *Suction Side Control*—is buried deep within the tractor.

Your Ferguson Dealer will arrange a "Showdown" demonstration of the new and far more powerful Ferguson "30" on your farm. He will gladly prove to you the advantages of the Ferguson System with *exclusive* Suction Side Control.

This Booklet Tells the Story

Important facts about the Ferguson System and *Suction Side Control* are clearly and simply explained in this new booklet. Ask your Ferguson Dealer for a copy of "The *Inside* Story of the Ferguson System with Exclusive Suction Side Control".
Harry Ferguson, Inc., Detroit 32, Michigan.



FERGUSON TRACTOR
and 63 Ferguson System Implements

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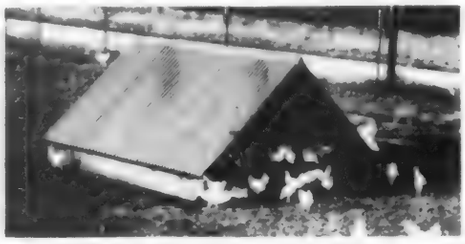
Ideas for the Farm

FOR MORE INFORMATION ON IDEAS DISCUSSED HERE, SEE END OF COLUMN

Bright Roof Preserver One coat of asphalt-aluminum costs little, lasts a long time, and has the extra advantage of reflecting summer heat—important in keeping livestock healthier. Use it on rolled asphalt or rustable metal roofs. And when you buy, look for the Warranty Seal that assures the right amount and grade of aluminum pigment in the right vehicle. Ask your dealer for his "Warranty" brand. Folder sent on request.

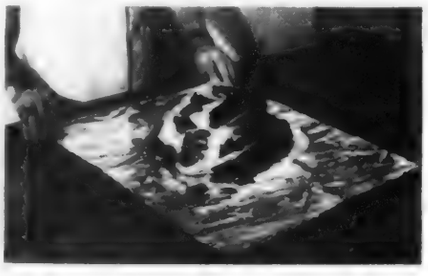


Moving Day Comes Regularly with your portable hog houses, chicken shelters, etc. They're much easier to move if built with aluminum roofing and siding. Yet this lighter metal has the solid strength you want on big barns, too. Wherever you use aluminum you can depend on lowest maintenance—no painting. Your poultry and livestock will be healthier because it's cooler under aluminum. Ask your dealer for Reynolds Lifetime Aluminum Corrugated and 5-V Crimp. Folder on request.

Pasturage Is A Money Crop if you count the cost of supplemental feed. To cut that cost, use a portable irrigation system. Pastures stay green from early spring to late fall. One test shows cows get 35% more grazing, produce 35% more milk. Portable irrigation systems extend the growing season of all crops. When you buy, insist on strong, rust-proof Reynolds Aluminum pipe . . . weighs only 16 lbs. per 20 ft. length. Illustrated 12-page folder on irrigation sent on request.

Turn Off The Heat is just what you want to do to keep milk or egg production up in summer, put weight on hogs. And that's just what you do with Reynolds Aluminum Reflective Insulation, tacked or stapled under roofs and inside walls of barns, poultry houses, hog shelters—or your own home. Aluminum foil on kraft paper, it reflects up to 95% of radiant heat. 250 sq. ft. in one 15-lb. roll. See your dealer. Ask for free folder.

Locker Plant Operators know the best way to wrap foods for freezing. They do it quickly, with no taping or tying, because they use Reynolds Aluminum Locker Wrap. These experts will tell you the end-result is better... practically no shrinkage or flavor-change. Cannot absorb juices or stick to product. Economical. Insist on this aluminum foil in your freezing. Illustrated folder on request.



Military requirements for aluminum affect total supply of these products. But production capacity is expanding. Keep asking your dealer.

FARM INSTITUTE Reynolds Farm Institute, Box 1800-C5. Louisville 1. Ky.

Please send literature on: Irrigation ☐; Locker Wrap ☐; Insulation ☐; Roof Coating ☐; Corrugated ☐; 5-V Crimp ☐.

Name .....

Address .....

FARM BOOKS

***Soil Conditions and Plant Growth**, by Sir E. John Russell, Eighth Edition, revised by E. W. Russell. Longmans Green and Co., New York, $8.75.*

First issued in 1912 by Sir E. John Russell, who at that time was Director of the great Rothamsted Experimental Station in England, the eighth edition of this brilliant book on applied soil science has been completely revised and rewritten by the son of the original author who is a soil scientist at the University of Oxford. This 635-page book is one of the most comprehensive explanations available today on the structural, chemical, and biological life of the soil.

***The New Joy of Cooking**, by Irma S. Rombauer and Marion R. Becker. Bobbs-Merrill Co., Indianapolis, $3.95.*

For the person who remembers with great longing the food that mother used to cook, back on the farm, this is the book. Such cookery is not a lost art. Irma Rombauer and her daughter Marion Becker have gathered together 4,000 tested recipes —some as Victorian as Yorkshire pudding, others as modern as preparing canned French snails. Having used the book we are convinced that the Joy of Cooking guarantees the joy of eating.

***A Practical Guide for the Beginning Farmer**, by Herbert Jacobs. Harper & Brothers, New York, $3.00*

Every year a new batch of farmers make their beginning in agriculture. Most of them, men born and raised on the farm, would find about as much use for this book as they would for a set of instructions on how to breathe. There are, however, city folk who are making the jump from the pressures of city living to the unknown, usually idealized, life of the farmer. For these this book will be valuable: for them it was written.

Herbert Jacobs, the author, is a farmer himself and knows that it is impossible to write a comprehensive book on agriculture. He also knows how difficult it is for the beginner to pick up a technical book on agriculture and, in his ignorance, get anything out of it. What he has done is to write an introduction that will give the beginning farmer some of the basic information that he will need to go on to more advanced reading. In keeping with this aim, most chapters end with suggested additional reading material on the subject covered.

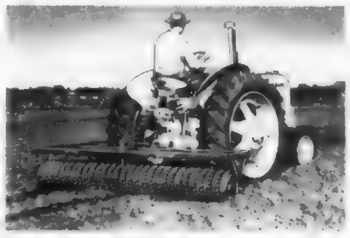
The book is broken down into three sections: a few opening chapters on the joys and trials of farm life; a long center section on farming practices with separate chapters on dairy and beef cattle, pigs,

(*Continued on page* 125)

A Brilliant New Way to Farm

There's a whole new day dawning of better, faster, easier farm work. It's one-minute mounting . . . right from the tractor seat . . . of big implements to hustle work on big acreages. It's easier, more accurate control for the modern conservation practices. Eagle Hitch Farming with the big 2-plow "SC" and 3-plow "DC" Case Tractors includes live power take-off to keep your combine or forage harvester running with full power when you start, stop, or shift gears. It gives you live hydraulic control, independent of clutch and gears. It brings light-footed ease of stopping with new double-disk self-energizing brakes.

EAGLE HITCH Farming

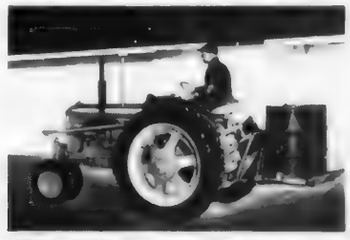


Eagle Hitch Roller-Packer lifts clear at a touch of hydraulic control—backs into corners, skips wet spots, travels highways without touching hard surface.

Spike-Tooth Eagle Hitch Harrow folds narrow for transport, spreads wide and flexible in the field, lifts at a touch of hydraulic control to shake out trash.

Case Forage Harvester gets going easily, keeps running steadily, with live power take-off drive from Case "DC" Tractor. No interruption of power when tractor halts.

Break-Away Contour Plow



Utility Carrier mounts in a minute on Eagle Hitch—lowers to load without lifting—hauls heavy boxes, barrels, bales, feed, fertilizer, fence materials, animals in rack or crate.

Here are big 2 and 3-bottom mounted plows that take only a minute to hook up—no lifting, no back-work, no tool kit needed. Break-away release allows main part of plow to "let go" on striking stone—saves shares and beams. Operator stays on tractor—recouples by backing up. Hydraulic control lifts plow to go over obstacle, lowers to go on. In normal operation plows are not carried by hydraulic system—instead, they float at depth set by handy turnbuckle. Pivotal action keeps furrow width uniform on contour curves and rounded corners, makes steering easy. Don't say it's too good to be true. See your Case dealer now about Eagle Hitch Farming—arrange for a personal demonstration.

Other Eagle Hitch Implements include 2-furrow disk plow, lift-type spring-tooth harrow, corn planters, field tillers, a variety of tool-bar implements, 7-foot mower, etc. Send for Eagle Hitch Implement book offered in coupon below.

SEND FOR THE FULL STORY

Case builds 25 great tractors, a full line of farm machines. For pictorial catalogs and folders, mark here or write in margin any that interest you. J. I. Case Co., Dept. J-90, Racine, Wis.

Eagle Hitch Tractors:

- ☐ Low-Cost 2-plow "VAC"
- ☐ Big 2-plow "SC"
- ☐ 3-plow Model "DC"
- ☐ Eagle Hitch Implements
- ☐ Forage Harvester
- ☐ Corn Pickers

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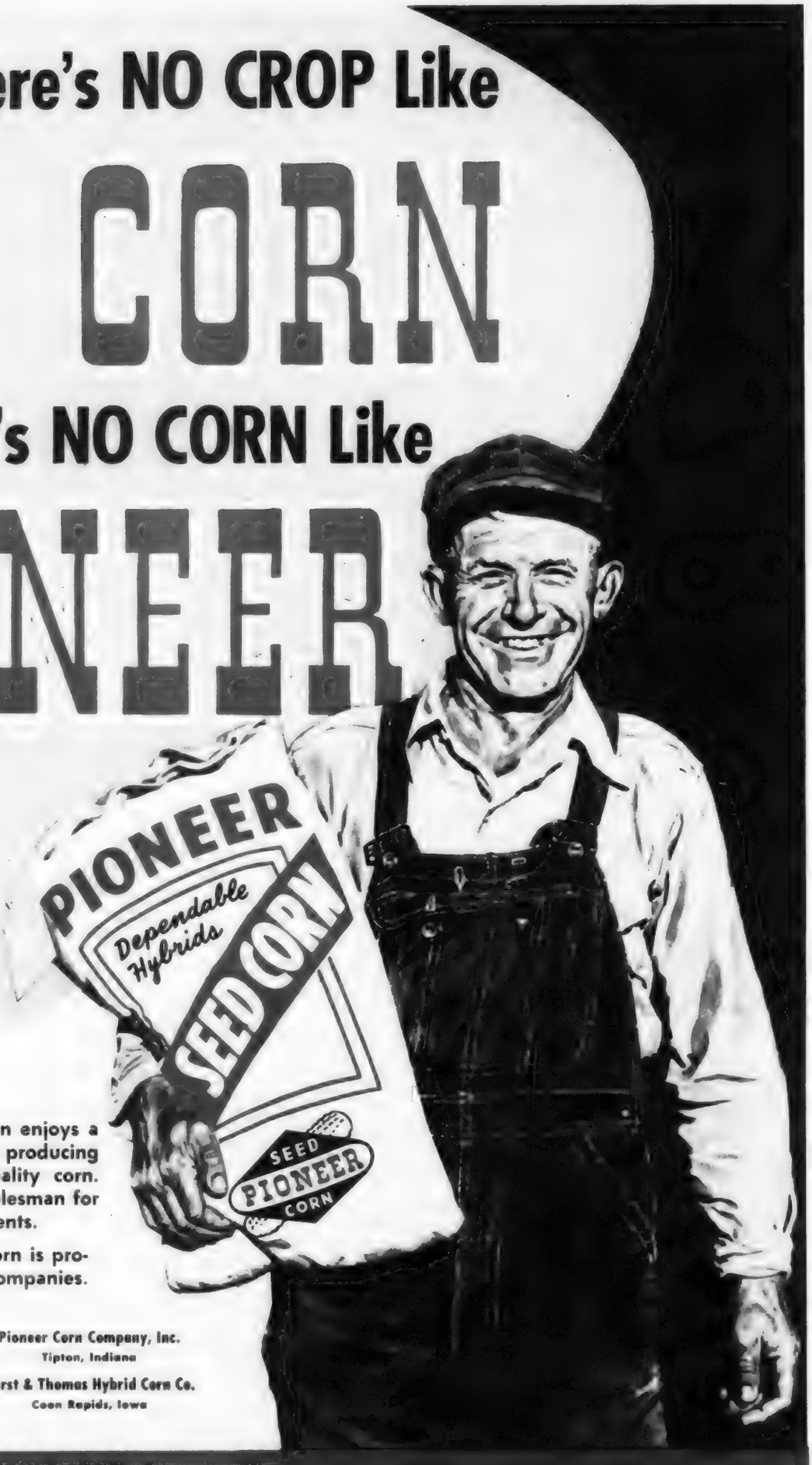
There's NO CROP Like

CORN

and There's NO CORN Like

PIONEER



PIONEER Hybrid Seed Corn enjoys a nation-wide reputation for producing TOP Yields of sound quality corn. See your local PIONEER Salesman for your next year's requirements.

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Fresh Air

MAKES THE DIFFERENCE BETWEEN JUST PROFITS AND BIG PROFITS!

Hudson

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Does the Job!

Here's why HUDSON Ventilation pays off

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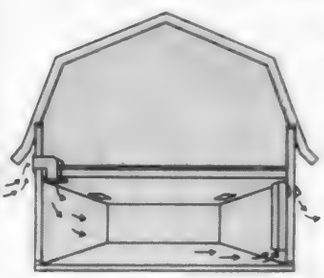
2. Gives better quality milk and eggs
3. Maintains greater herd health
4. Assures longer production life
5. Protects barns from rust, rot, and decay
6. Cuts feed consumption and spoilage

When you put in your new ventilation equipment remember you need *more* than just a fan—you need a system designed to expel *sufficient* air regardless of outside wind pressure . . . a system that provides for the *intake* of sufficient fresh air . . . a system that will, if needed, let you expel air from the floor line as well as the ceiling . . . a system that *you* can easily and economically install.

You get this and more with Hudson Lektrik-Air Ventilation . . . because Hudson pioneered electric ventilation over a quarter century ago . . . because Hudson's 28 years of research, experience, and engineering skill combine to give you quality that is proved—equipment that *does the job!*



EASY TO INSTALL. Hudson ventilation engineers will show you how you can put in your unit yourself. They'll recommend the size and type of unit you need in your barn, the number and placement of air intakes, and other points to help assure an efficient, satisfactory system.

H. D. HUDSON MANUFACTURING COMPANY
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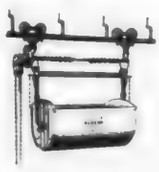
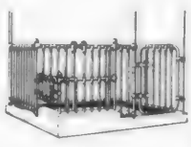
Stalls and Stanchions. All types. Save up to $2.50 per stall on installation.



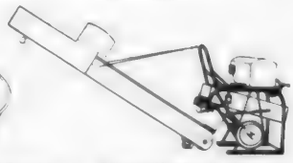
Litter Carriers. Move on track at touch of hand. Roller bearing wheels.



Dairy Barn Pens. All types. Panels pre-assembled for easy installation.

Ezy-Feed Truck. 16 bu. Hauls enough feed for 20 cows. Rubber cushion ball bearing wheels.

Sani-Kleen Water Bowls. Non-siphoning. Easy to clean. Trouble-free valve.



Automatic Barn Cleaner. Proved conveyor belt principle—rubber belt in gutter.

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HUDSON

Tested and Proved

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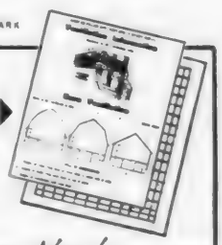
HAY TOOLS AND BARN EQUIPMENT

Free VENTILATION PLAN SHEET

Write today for plan sheet and full information on a Hudson Lektrik-Air System to fit your barn.



Send this Coupon Now!

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Please send me my FREE Ventilation Plan Sheet and full details on how I can profit with Hudson Lektrik-Air Ventilation.

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The NEW FOX Forage Master

with THE QUICK CHANGE Harvesting Units

The New Fox is lighter but stronger, smaller in size but with greater capacity and has many new features.
The pioneer grass silage harvester with a 5 ft. mower bar and individual power unit.
The 548 with power take-off drive and corn harvesting unit.
The New Fox Crop Blower is 2½" lower than the previous model, allowing more clearance for the unloading wagon.

No other forage harvester has the Quick-Change Harvesting Units that can be changed from hay to corn in less than 10 minutes by one man and without tools.

• The New Fox Forage Master with the Quick-Change Harvesting Units is the sensation of modern agriculture. All over the country farmers who use the FOX are reporting maximum harvests with a minimum of labor. Not only is the FOX harvesting record crops — whether grass, hay or corn — but it is doing it day in and day out without any time off for breakdowns and repairs. You can't go wrong when you buy a FOX as you have the pioneer of forage harvesters.

FOX RIVER TRACTOR COMPANY

The Pioneer of Modern Forage Harvesting

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APPLETON FOX WISCONSIN

DAIRY BARN

Milking By Tractor When Steve Elsaesser, a blind dairy farmer who lives on the outskirts of Cincinnati, Ohio, found that a storm had knocked out his electricity and stopped his milking machine, he remembered some of the basic facts about the internal combustion engine and decided that there were easier ways to milk his 38 Jersey cows than by hand. Elsaesser recalled that the windshield wiper on his truck was powered by vacuum which was supplied by the engine. He had his wife drive the farm truck to the dairy barn and, working by touch alone, connected the vacuum line from his milking machine to the wiper connection on the intake manifold of the engine. Then he started the truck and went on with his milking.

Elmer Bohlen, a dairyman from Hilliard, Ohio, who is shown here, has used the same trick with the Ferguson tractor as the vacuum source for his two-unit milker.

Elmer Bohlen hooks up his tractor to the milking machine

Any of the gasoline engines used in automobiles, trucks, or tractors will pull from 18 to 21 inches of vacuum, which is more than enough for a milker. Cars and trucks which use their vacuum to power the windshield wiper can be easily converted for milking machine use. On many tractors and on some cars which do not have the wiper take-off, the intake manifold is already fitted with a quarter-inch plug for testing the engine. If such a tap has not already been drilled, the garage can drill and thread one at very little cost. Then all that remains to be done to convert the engine into a stand-by vacuum source is to secure a petcock to connect the hose from the vacuum line of the milker to the intake manifold.

In operation it will be found that the slower the engine speed, the more vacuum it draws. Since most milkers operate at about 15 inches of vacuum the engine should be run at about one-third speed. For the low-vacuum milkers the engine will have to run faster.

Two Deadly Weeds Cows are pretty particular about the stuff they eat. They *will* nibble at poison ivy, but it does them no harm. Most times they will wade right through poisonous weeds to get to good forage. During drought, or in the early fall when pastures get thin, a hungry animal is tempted to take a chance. From the first cautious nibble to the last hungry gulp may be but a few swallows.

There are at least 40 poisonous plants in America, but two weeds can be especially dangerous because of their seeming innocence. Horse nettle and jimson weed are so common in barn lots and heavily pastured areas that many farmers ignore them. Eaten green in certain seasons, or dried in hay, they can mean the loss of valuable stock. Both plants belong to the Nightshade family.

Horse nettle is often so common in old hog lots that it covers

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xt milker . . . The De Laval
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into your 40-qt. milk cans. No stooping or
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De Laval Magnetic Speedway

Controlled Milking—at every vital point. The only milker with absolutely uniform, magnetically controlled pulsations for highest, even milk production. Simple, dependable and the milker for the man who wants the best.

De Laval Sterling Speedway

De Laval-quality milking at lower cost—the leader of the pneumatic pulsator type milkers. Pulsator has only two moving parts and provides precise, accurate milking. Units will operate on any make pipe line.

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Designed for the herd of 10 cows or less—to provide real De Laval milking and sanitation at lowest cost for the small herd owner. Saves time, labor and money. Install in two hours or less.

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Farmers demand ARO
COMPLETE LINE
ARO has the lube-answer for every farm need! Just what you need . . . for faster, better lubrication. Reasonably priced . . . growing popularity! See Your Equipment Dealer. The Aro Equipment Corp., Bryan, Ohio.

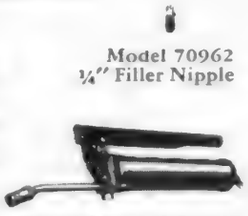
"THE HUSKY"—Aro's 10,000 lb. gun. High pressure to crack plugged fittings. One-hand operation. (*Shown above*)

GREASE GUNS and FILLERS

New Model 60032 Farmaster lubricator saves time by delivering more lubricant before recharging. Dispenses from original 25-35 lb. container . . . develops to 6000 lb. pressure. One-hand operation.

Aro filler assembly 70963 with nipple used with any hand-operated lubricator . . . extra service as gun filler.

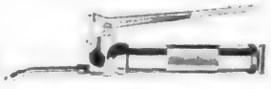
Model 70530 Suction Gun for general use.



Model 2030-F Grease Gun, 1 lb. capacity, low priced, for general farm use.

Model 70962 ¼" Filler Nipple

Model 70961 ⅛" Filler Nipple



Model 2643 Grease Gun . . . heavy-duty lubrication.

Model 60048 Gun Filler, 100 lb. capacity. Loads any hand gun equipped with Aro Filler Nipple.

Complete line of grease fittings. .

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Air-Powered High Pressure Lubricator . . . 60 lb. bulk grease capacity . . . will operate off 1 h.p. compressor. Equipped with 10′ H.P. hose.

Double-Duty Lubricator, hand-operated. 30 lb. capacity. Pump develops to 2,000 lb. pressure . . . used as lubricator, or loading hand gun.

High-Pressure Hand-Operated Lubricator . . . pump develops to 5,000 lb. pressure . . . Can be refilled with entire 25 lb. container.

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the ground. It has dark green leaves, a lavender five-petalled flower, and orange berries that look like small tomatoes. This weed may be harmless during rapid growth, but deadly when it is stunted by drought or frost. The berries and roots are especially potent.

It affects animals in degrees running from sleepiness to paralysis and death. Sore skin on the udders of dairy cattle can often be traced to it. Horse nettle is also a host for tomato mosaic virus, harboring it through the winter in its roots.

Jimson weeds, some of them as tall as a man, grow in many feed lots and pastures. This long-leafed plant, with a white tubular flower, and seed pods that are sometimes called thorn apples, can take a terrible tramping from cattle and hogs and come up for more. In many barn lots, jimson weeds are the only plants able to take the gaff, and even these are often stripped to bare stems and seed pods. These thorn apples are especially dangerous, only a few seed being enough to kill a hog—each pod contains several hundred seeds. Curious children have been poisoned by them, too.

Although the seeds are especially dangerous, other parts of the plant are poisonous, too. Jimson seeds in hay or silage can do their dirty work.

Animals that have sampled the leaves or the evil-smelling seeds can be spotted for they soon begin to breathe rapidly, become restless, and may tremble. The animals strain in an attempt to urinate. A stomach pump may save a sick animal, but it's a long gamble.

Grubbing or mowing and burning will give some control. If you spray with any of the modern sprays, keep all stock away until the plants are well rotted, or burned. Animals that have left well enough alone change their minds fast when they taste the dying plants which become more palatable.

Stand clear of the smoke when you burn these weeds—there's enough poison in jimson weed smoke to make a man pretty sick.

X-Disease If one of your cows looks tired, slobbers, and weeps, she may be getting Hyerkeratosis (sometimes called X-disease.

After an infected animal has had a good cry, the first indication of infection, she begins to lose weight (although she may eat well), her hair comes off in spots, and her skin gets dry and leathery. Pus may form under hard folds of the skin and fleshy growths appear in the mouth and around the gums and tongue.

Although a few herds have been wiped out, the disease is not always fatal. It has been around for at least ten years, but the vets still don't know what causes it nor how to cure it. Everything from anti-rot compounds on silo walls to the atom bomb have been blamed for causing it. No one has even come close to a cure.

How you can "Pep Up" ailing acres..make a good farm better with FORD TRACTOR POWER

What about those under par acres? A Ford Tractor teamed with sturdy, low-cost Dearborn Implements can help these acres "get well"—and boost your income—with surprisingly little work and expense.

The Ford Tractor gives you power, easy handling and built-in Hydraulic Touch Control of most implements. Efficient, quick-changing Dearborn Implements are good at many different jobs. Ask your Ford Tractor dealer about ways to make a good farm better with this modern equipment.

PRICED TO SAVE YOU $50 TO $500*

Compare prices! A brand new Ford Tractor with all its advanced features (including new Proof-Meter) sells for from $50 to $500 less than any other leading 2-plow tractor in most farm communities. See your Ford Tractor dealer now for a demonstration.

*Comparison of suggested list prices of the standard Ford Tractor and other leading standard 2-plow tractors priced with hydraulic lift.

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National Marketing Organization for the Ford Tractor and Dearborn Farm Equipment

What the name Ford on a tractor means to you!

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You can probably save from $50 to $500 over other two-plow tractors with comparable equipment.

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Thrifty to run; economical to maintain year after year.

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Just call your nearby Ford Tractor dealer for prompt service.

PARTS ALWAYS AVAILABLE
Genuine Ford parts availability keeps all Ford products ready to go.

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Outstanding performance; easy to use for more different kinds of jobs.

QUALITY CLEAR THROUGH
High quality standards, kept high by constant test and inspection.

TOP VALUE AT TRADE-IN TIME
Even after years of use, Ford Tractors bring good prices.

these are only 4 of the hundreds of ways of doing it!

Build or maintain ditches, terraces, driveways—move snow, windrow materials with the Dearborn Utility Blade.

For about the price of a good purebred heifer calf, you can buy the quick-attached, big capacity Dearborn Rear Mounted Loader!

Renovate, cultivate, chisel, control weeds and do mulch tillage with the stout Dearborn Field Cultivator.

Refencing can be this easy—up to 600 post holes daily—with the Ford Tractor and Dunuser Post Hole Digger.

Ford TRACTOR

Ford Farming MEANS BETTER WORK ... MORE PRODUCTION

Double the years

between re-ring jobs with

How often do you change piston rings in your tractor? . . . every year . . . 2 years . . . 3 years? With Perfect Circle's 2-in-1 Chrome Set you can *double* the time between ring changes . . . cut yearly ring overhaul costs in half!

Here's why: tractor engines take a terrific beating from dust, dirt, and long hours of continuous service. But the 2-in-1 set is plated with *solid* chrome, which resists wear and breaks down dust and dirt particles, preventing scuffing and scoring of cylinder walls. What's more, 2-in-1 offers a choice of springs with every oil ring, to assure correct pressure regardless of cylinder condition!

In truck and car engines too, insist upon the 2-in-1 Chrome Set for double life, sustained power and maximum oil economy—even under most severe operating conditions. Perfect Circle Corporation, Hagerstown, Indiana; The Perfect Circle Co., Ltd., Toronto, Ontario.

Perfect Circle
PISTON RINGS
The Standard of Comparison

Solid chrome protects these wearing surfaces. Normal pressure and alternate HiPressure springs (for badly worn cylinders) packed with each oil ring.

LETTERS

Farm Insurance

Sirs:

I have read with great interest Mr. Tinley's article on *Farm Insurance* in your summer issue. I have found no better summary on the subject. Many of my clients are farmers and I want them to read this article.

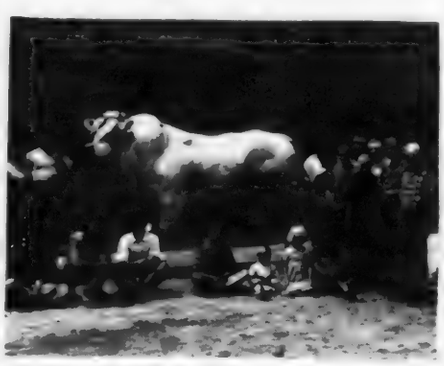
Clifford M. Blunk
Attorney-at-Law
Springfield, Ill.

Italian Big Bull

Sirs:

I was very much interested in your story on the big bull. I am prompted to submit a photograph that I made of a Chianini bull near Arezzo, Italy, last Summer, that I believe is even larger than the one you featured. The registered weight of this bull is 1550 Kg. which is the equivalent of 3410 pounds.

Charles J. Belden
St. Petersburg, Fla.



A Chianini bull, the Italian contender for heavyweight champion.

Rain-Makers at Work

Sirs:

With one year of rain increasing experience under our belt, most of the people in this section of South Dakota feel it is a thing we would never be without again. We have signed another contract this year with Dr. Krick's Water Resources Development Corporation for a 5-year operation.

When Dr. Krick's representatives first explained their operations to us in this area in the spring of 1951 there was some scepticism. The firm's representatives were careful to explain to us that their methods were still experimental, that they did not make rain, and that their objective was to increase rain when natural rain would occur anyway. They told us we were not buying rain, but that we were buying professional service.

Today we believe this. They told us the modification of the weather would produce slower, more gentle rain made up of finer drops, that these rains would be more wide-spread and would last longer and that if there was hail it would be a different kind of hail than we were used to in that it would be smaller and softer. Everything that happened after they set up their silver iodide generators here in South Dakota last spring was just the way they had told us it would be.

Our grazing land and our crops were excellent this year. It was a rather common observation that calves for market from commercial cattle herds in the fall of 1951 averaged about 100 pounds more than for several years preceding. In short, we were more than happy

FOR

Thorough Penetration Prolonged Action

TREAT MASTITIS WITH PENDISTRIN® SQUIBB

Here's how Squibb's special ointment base carries the high-potency antibiotics of Pendistrin high up into the quarter to fight infection.

Each "instant-use" tube of PENDISTRIN contains 100,000 units of PENICILLIN Plus 100 mg. of DIHYDROSTREPTOMYCIN ...formulated in Squibb's *Special* Ointment Base

Squibb's *Special* Ointment Base makes high-potency antibiotics more effective!

The special "carrying agent" of Pendistrin Squibb aids two ways in treating mastitis.

One: It melts quickly, and disperses thoroughly throughout the treated quarter.

Two: It releases the antibiotics slowly... over a period up to 48 hours.

This makes certain the highly-potent combination of 100,000 units of penicillin plus 100 mg. of dihydrostreptomycin reaches the infection no matter where it may be in the quarter.

Further, it makes certain the antibiotics of Pendistrin are available in the quarter at the moment in the life cycle of the causing organism when it is most susceptible to antibiotic action.

Pendistrin comes in the handy "instant-use" tube. It is stable, non-irritating. Antibiotics are held in complete suspension—will not settle out.

Get Pendistrin from your druggist. Write for free literature: E. R. Squibb & Sons, Veterinary and Animal Feeding Products Division, Dept. FQ-A, 745 Fifth Avenue, New York, N. Y.

For the most common kind of mastitis
SQUIBB PENICILLIN OINTMENT

For mastitis caused by streptococcus agalactiae—the most common kind—use Squibb "Instant-Use" Penicillin Ointment. Proved successful in millions of cases over a 3-year period. Ask for it—at your druggist's.

For accurate diagnosis of mastitis, consult your veterinarian.

Get handy "barn box" from your druggist!

It pays to treat mastitis *at the first sign.* Get a handy "barn box" of 12 "instant-use" tubes of Pendistrin—keep them on your barn shelf. No refrigeration required. See your druggist today.

SQUIBB — A NAME YOU CAN TRUST

PENDISTRIN (Reg. U. S. Pat. Off.) is a trademark of E. R. Squibb & Sons

English Type
RAIL and HURDLE
FENCE
Large Stocks . . .
Prompt Shipments . . .
Hand Split Chestnut Rails.
Peeled Chestnut, White Cedar
or Locust Posts
NEW! PENTA
PRESERVATIVE
FOR ENTIRE FENCE
We are now equipped to furnish your ENTIRE FENCE (both posts and rails) treated with nationally known PENTA PRESERVATIVE. Protects Fence against decay, mold, mildew, termites, etc. Effective control over swelling, warping, shrinking and grain raising.
THIS PROTECTION IS NEW. MEANS MUCH TO THE LIFE OF YOUR FENCE. WRITE FOR CATALOG AND PRICES.
WHITE CEDAR
SCREEN FENCE
For Privacy
WOOD PRODUCTS CO. TOLEDO 12, OHIO
DEPT. M.

Production Records prove it pays to feed Sacco

Burton Honsberger of Twin Cedar Farm, Sycamore, Ohio, lets his DHIA Production Records tell him which mineral to feed his livestock. He says, "I have used mineral costing me $14 per hundred but Sacco V-19 gives me just as good results. We feed it to Guernseys, Durocs and Shropshires so can recommend it to anyone. Have used Sacco for 15 years and it saves us a lot of money." Sacco V-19 is the dependable mineral for top production of meat, milk and eggs. Sacco is complete, balanced and fortified with 24,000 units of Vitamin D added to every pound. You can't buy a better mineral so why pay more? There's a Sacco dealer near you.

SACCO V-19 MINERAL FEED

THE SMITH AGRICULTURAL CHEMICAL CO.
Plants at Columbus, Ohio; Indianapolis, Ind.; Saginaw, Mich.; Holland, Mich.; Carey, Ohio.

at the end of our first year of weather modification.

J. A. Wallace
Colonel, USA, Retired

Custer, So. Dakota

From the Yakima Valley in Washington has come the word that the wheat-growers have hired rainmakers and that the cherry-growers who don't want rain during the picking season have hired an anti-rainmaker. So far the rain-stopper seems to be winning.—Ed.

Want to Go Into the Marl Business?

Sirs:

I have an analysis card from a product, "Kaylorite," which seems to be identical with my marl, with nothing added. Kaylorite is mined near my farm.

I have just spread some of my marl on pastures to experiment on what value this marl will have as a fertilizer to my grass and pasture.

While waiting to see what effect this marl is going to have on pastures, I wish to find out whether it has any commercial value, like selling it as a filler, or as an ingredient for fertilizers.

Ulysses W. Froe

RFD Box 15,
Lothian, Md.

Who Makes the Paints?

Sirs:

Would you please send me the addresses of companies manufacturing the paints which were mentioned in the article "Twelve Special Paints" in the Summer, 1952, issue of your magazine?

Mrs. Edwin L. Byrnes

Devils Lake, N. Dak.

"Low Lustre"—Armstrong Paint and Varnish Co., 1365 S. Kilbourn St., Chicago, Ill.

"Sapolin"—Sapolin Co., Inc., 229 E. 42nd St., New York 17, N. Y.

"Paratex"—Truscon Laboratories Div., Devoe & Raynolds, P. O. Box 69, Detroit 11, Mich.

"Duco"—E. I. duPont de Nemours and Co., Wilmington 98, Delaware.

"Permite Aluminum"—Aluminum Industries, Inc., 2438 Beekman, Cincinnati, Ohio.

"Dampchex"—American Fluresit Co., Inc., Red Bank Rd., Cincinnati, Ohio.

"Pre-harmonized Wall Paint"—Eagle Picher Co., American Bldg., Cincinnati, Ohio.

"Spred-Satin"—Glidden Co., 11001 Madison Ave., Cleveland 2, Ohio.

"Fabuloy"—Pierce and Stevens, Inc., 724 Ohio St., Buffalo, New York.

"Wallhide Rubberized"—Pittsburgh Plate Glass Co., 632 Duquesne Way, Pittsburgh 22, Pa.

"Super Kem Tone"—Sherwin-Williams Co., 101 Prospect Ave., NW, Cleveland, Ohio.

"Firzite"—U. S. Plywood Corp., 55 W. 44th St., New York 18, N. Y.

Anyone Have a Suggestion?

Sirs:

My son and I are very much interested in farming, so much that I would like very much to turn my home into some kind of a farm school.

It's not what you call a farm. It was built and used for a library for years by a Dr. Sondley. I believe we could accommodate from 30 to 50 students. The house has 15 rooms, all good size, and a large recreation room. There is a cottage in back of the house, a large barn and out-buildings. It has a small lake for swimming, plenty of water for irrigation, and about 30 acres of tillable land, some pasture and the rest of the 206 acres in woods.

How could I go about finding someone with experience and some capital to help me get into this kind of business?

Dolly Kalogerakis

139 Patton Ave.
Asheville, N. C.

The New Holland "77" twine-tie baler can package up to 10 tons of hay an hour . . . hour after hour.

"Not one miss in 4500 bales! ...with our New Holland "77""

says *ELLSWORTH WAITE, WAITE FARM, ALEXANDER, N. Y.*

"DAIRYING is our main business," says Mr. Waite, "and we have 70 head of pure-bred Holsteins. Last year we bought a New Holland baler to cut down on time and labor in operating our 400-acre farm.

"During the season we put up 14,000 bales—all our own hay. Our "77" tied 3,000 bales of hay and 1,500 bales of straw *without missing a bale.* That's what I call enjoyable work.

"Our dealer, the Goodridge Farm Supply of Alexander, N. Y., has done a wonderful job of service and upkeep for us. When haying was done, our total repairs amounted to $2.75.

"For the year, our stock produced 18,000 pounds of milk and 732 pounds of butterfat. This was a superior year and we know our "77" baler was a big factor in helping us reach this goal."

Here's why you, too, can count on New Holland for fast, trouble-free baling:

Highest capacity—You can bale up to 10 tons of hay an hour with the "77"! Many twine-tie balers have only half that capacity—none beat New Holland. Fast baling is the one sure way to fill your barn with top-quality hay . . . it takes speed to beat rain and sun damage.

Gentle baling action—New Holland baling action keeps leaves and blossoms on the stem—doesn't shake them out into the field. A New Holland bale can contain up to 50% more feed value for your stock.

Low maintenance—The rugged, heavy-steel "77" is designed with fewer parts for smooth, trouble-free operation. It's ready to go and keep going all season. Repairs and upkeep are cut to a minimum.

More experience—New Holland was first in the field with the automatic twine-tie baler and is today the world's leading manufacturer of this type of baler. You benefit from this long experience in design and manufacture when you buy a New Holland.

Dependable service—New Holland dealers carry a full inventory of spare parts for immediate replacement. Their servicemen are trained in the latest techniques for servicing New Holland farm machinery.

Start planning on a "77" now. Ask your New Holland dealer for a demonstration. If you prefer a wire-tie, see the Model "80" . . . it gives you up to twice the capacity of other wire-tie balers. The New Holland Machine Co., a subsidiary of The Sperry Corporation.

New Holland Twine is Certified by the United States Testing Co. to meet rigid standards of quality. It's fast-running, easy-knotting and strong. Don't spoil your baling with inferior twine. Save yourself trouble and ask for New Holland Certified Twine.

NEW HOLLAND *"First in Grassland Farming"*

New Holland, Pa. • Minneapolis • Des Moines
Kansas City • Brantford, Ontario

FREE Check catalog you wish and mail coupon to:
New Holland Machine Co., 909 Pine St., New Holland, Pa.

- ☐ Twine-Tie Baler
- ☐ Wire-Tie Baler
- ☐ Forage Blower
- ☐ Baler Twine
- ☐ Baler Wire
- ☐ Forage Harvester —Row Crop or Hay unit
- ☐ Farm Wagon
- ☐ Tractor Mower
- ☐ Side Delivery Rake
- ☐ Portable Tractor Saw
- ☐ Spreader-Seeder

Name_____

Street or RFD_____ Acres Farmed?_____

Town_____ County_____ State_____

Rolls 275,000 trouble-free Miles

with an EATON 2-Speed Axle

"And," says Edgar M. Herr, *"with plenty of savings!"*

IT WON'T BE GONE LONG — Edgar M. Herr (left) supervises loading one of his Eaton-equipped Fords. His cousin Harry Herr is shown on right. Part of the load of feed is going to his brother's farm. There are some tough hills to climb, but it won't be a long haul —Eaton 2-Speed Axles enable trucks to climb hills fast.

GOING UP'S A CINCH! "Steep climbs with a full load are easy with an Eaton 2-Speed," says Mr. Herr. "The low-gear range provides the pull needed. It cuts hill-climbing time, too, and it's mighty handy off the road when the going's tough."

THE HERRS of Quarryville, Pa., not only work their own farm, they also serve other farmers — Edgar Herr lives on his father's 65 acres, runs a feed business and hauls milk for his neighbors.

The job keeps eight Ford trucks on the go — and every truck is equipped with an Eaton 2-Speed Axle. Says Mr. Herr:

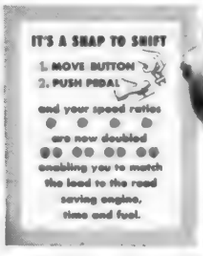
"They save me gas and time — I am able to get in and out of tough places — and they're trouble-free. One of my Fords has gone 275,000 miles and I haven't had a bit of trouble with the axle. My trucks have some heavy loads to pull."

Eaton 2-Speed Axles are great dollar-savers for farmers. The high-gear range saves hours of time and gallons of gas on the highway with less engine wear. The low-gear range provides the extra pull a farm truck needs for poor roads, plowed fields and off-the-road work. Your truck dealer will be glad to show you why Eaton 2-Speed Axles mean more money in your pocket. Ask him about Eaton 2-Speeds when you're ready to "talk trucks."

FARMERS LIKE EATONS — "An Eaton 2-Speed Axle is a mighty good piece of equipment," says Walter E. Cramer, Truck Manager, Garden Spot Motor Company, Lancaster, Pa. "An Eaton 2-Speed enables a Ford to climb stiff grades easily. That's why they're so popular with farmers around here."

EATON 2-SPEED *Truck* AXLES

EATON MANUFACTURING COMPANY, CLEVELAND, OHIO



MORE THAN A MILLION IN TRUCKS TODAY!

America's roads are now carrying twice the traffic they were designed to bear. Speak up for more and better roads — help end the dangerous crowding of our highways.

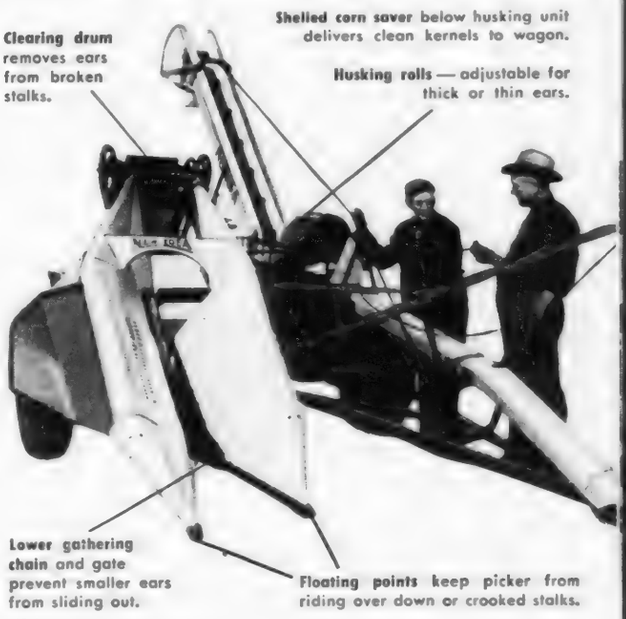
More clean ears in cribs... fewer left in fields

Just watch a NEW IDEA Corn Picker at work. You soon see why it snaps more corn . . . husks more ears cleaner. Floating points, sensitive to ground contours, slide under leaning, bent or down stalks and guide them between low-reaching gathering chains. A short chain skims ground for down corn; total of three chains gives positive delivery to blunt-end snapping rolls — rolls with wide adjustments for varying field and crop conditions.

Dry or damp, brittle or tough, long or short . . . ears are sure to get snapped and delivered to husking rolls with a NEW IDEA Picker. Specially designed, adjustable husking rolls work with six floating presser wheels to maintain uniform pressure for clean husking . . . but with minimum shelling.

One man can pick from 8 to 12 acres (from 500 to 1000 bu.) in a normal day's work with a NEW IDEA 1-row picker, or 12 to 18 acres with the 2-row job. You can count on many years of steady, efficient service from a NEW IDEA Picker. Your NEW IDEA dealer is waiting to show you more reasons why *it's a good idea to own a* NEW IDEA *Picker.*

Winner of 1951 *National Picking Contest and all official state contests — New Idea one-row picker.*


Clearing drum removes ears from broken stalks.
Shelled corn saver below husking unit delivers clean kernels to wagon.
Husking rolls — adjustable for thick or thin ears.
Lower gathering chain and gate prevent smaller ears from sliding out.
Floating points keep picker from riding over down or crooked stalks.

Two-row New Idea Picker *has all outstanding features of one-row picker . . . plus big farm capacity.*

NEW IDEA SUBSIDIARY **AVCO** MANUFACTURING CORPORATION
FARM EQUIPMENT CO.

Dept. 613, Coldwater, Ohio

Mail coupon today for free folders!

Send free folders as checked:

- ☐ Manure Spreaders
- ☐ Lime Spreaders
- ☐ Hydraulic Loaders
- ☐ Stalk Shredders
- ☐ All-Steel Wagons
- ☐ Steel Wagon Boxes
- ☐ Tractor Mowers
- ☐ 4-Bar Rakes & Tedders
- ☐ Hay Loaders
- ☐ All-Purpose Elevators
- ☐ Corn Pickers
- ☐ Corn Shellers
- ☐ Transplanters

Name_____

Address_____

THE NEW POWER-PACKED
'52 CULTILLER
LOWEST-PRICED HI-POWER ROTARY TRACTOR ON THE MARKET!

You Will Produce MORE with a CULTILLER

Rotary Powered '52 CULTILLER FOR
Gardening
Composting
Lawn Mowing
Hauling
Cultivating
Mulching
Snow Plowing
Spraying
Weed Cutting
Take-Off
Scything

Gardening and field experts agree that the 1952 CULTILLER ROTARY TRACTOR OUT-PERFORMS and OUT-PRODUCES THEM ALL! More features than any other rotary tractor of its kind! A complete range of easily interchangeable attachments makes the CULTILLER readily adaptable for making perfect seed beds, rolling lawns, sickle-barring, spraying! CULTILLER ROTARY TRACTOR, without changing to any other attachments, PLOWS, DISCS, HARROWS in one operation!

- REVERSE & SELF-CLEANING TINES!
- DIFFERENTIAL ON BOTH WHEELS FOR EASE OF HANDLING!
- AUTOMATIC CLUTCH FOR FORWARD SPEED VARIATIONS!
- AUTOMATIC TRANSMISSION (1st, N, R)!
- POWERFUL 3 HP CLINTON ENGINE!
- GOODYEAR TRACTOR TREAD TIRES!
- HANDLES LIKE A DREAM—EVEN WOMEN & CHILDREN CAN OPERATE!

Special cutting blades available for undercutting sod and cover crop!
Write Today for Catalog & Prices

CULTILLER CO. DEPT. F • 162 CHURCH ST. NEW BRUNSWICK, N. J.

Do You Need Farm Pictures?

The editorial department of FARM QUARTERLY has classified and indexed 15,000 excellent black and white negatives of farm scenes. Prints are available, 11x14, at $10 and up depending on use.

Photographic Department
FARM QUARTERLY, Cincinnati 10, Ohio

THE FARM'S PICTURES

COVER BY KAZIK PAZOVSKI

5—Fred Knoop. 30—Kazik Pazovski. 31—Kazik Pazovski; Fred Knoop. 32—Kazik Pazovski; Soil Conservation Service. 33 and 34—R. J. McGinnis. 35—R. J. McGinnis; Fred Knoop. 36 and 37—J. M. Arnold, Jr. 38—Grant Cannon. 39—Skippy Adelman-*Black Star*. 40—Grant Cannon; Skippy Adelman-*Black Star*. 41—Dairy Science Dept., University of Illinois. 42 and 43—Fred Knoop. 44—James Mfg. Co.-McLachlan. 45—Kazik Pazovski. 46—University of Wisconsin; Kazik Pazovski. 47—University of Wisconsin. 48 through 51—Kazik Pazovski. 52—Harold M. Lambert. 53—Harold M. Lambert; Don Wooldridge-*Missouri Conservation Commission*. 54—Paul A. Moore-*Tenn. Conservation Dept.*; Carlos Vinson; 55—Paul A. Moore-*Tenn. Conservation Dept.* 56—Kazik Pazovski; American Cyanamid Co. 57—American Cyanamid Co. 58—Kazik Pazovski. 59—American Cyanamid Co. 60—Kazik Pazovski. 61—Grant Cannon. 62 and 63—Grant Cannon; Kazik Pazovski. 64—Joe Munroe; Caterpillar Tractor Co.; Charles R. Koch. 65—Brillion Iron Works; Corson Bros.; Eversman Mfg. Co.; Harry Ferguson, Inc.; Fred Knoop; Ohio State University; John Deere Co. 66—Kazik Pazovski. 67—Dept. Animal Pathology, Michigan State College. 68—Grant Cannon. 69—Courtesy of The Lamp, Standard Oil Co. (N. J.). 71—Fred Knoop. 79—Farm Home Cover by Fred Knoop. 80 and 81—Kazik Pazovski. 82—Chr. Hansen's Laboratory, Inc. 83—Chr. Hansen's Laboratory, Inc.; Kazik Pazovski. 84—Cincinnati Gas & Electric Co.; Rural Electrification Administration. 85—Underwriters' Laboratories, Inc.; Cincinnati Gas & Electric Co. 87—Kazik Pazovski; Rural Electrification Administration.

FIRST IN THE FIELD WITH THE RIGHT COMBINATION

This smooth-working team is the ideal combination for efficient farm operation. The Templeton Hydraulic Helper is the lightest, smoothest, sturdiest loader you ever operated. Attached in a few minutes to any row crop tractor it lifts a full ton without strain on the tractor frame. Can be quickly changed over to scoop, bulldozer and snow plow attachments. The husky Templeton Power Spreader handles 125 bushels. Synchronized beater and distributor blades shred and distribute the toughest manure in a wide uniform pattern. Treated wooden box is mounted on a heavy welded channel frame for long life in all kinds of weather.

YOUR TEMPLETON DEALER
will demonstrate the many exclusive features of this Templeton team. He can show you why these implements are the right combination for you — how they will do the work quicker, easier, and stay on the job the year 'round.

UNITED IMPLEMENTS, INC. • LEXINGTON, OHIO

Here's why it pays to build your mineral feeding program around Morton's Free Choice Trace Mineralized Salt

Livestock must have ALL these 17 minerals or elements

OXYGEN — Needed for the oxidation of nutrients and energy.

HYDROGEN—A part of all important body fluids.

NITROGEN — The foundation of all tissues, particularly of proteins.

CARBON — The basis of the carbohydrates—needed for energy.

CALCIUM — For sound teeth, sturdy bones, and certain enzymes.

PHOSPHORUS — Essential to all cells, various enzymes. Works with calcium in bone formation.

POTASSIUM — Important to nerves, muscles, growth, and important enzyme groups.

MAGNESIUM — For normal structure of growing tissue; certain enzymes.

SULPHUR — For certain amino acids, insulin, various enzymes.

CHLORINE — (from salt) For hydrochloric acid needed in protein digestion.

SODIUM — (from salt). Maintains fluid balance of the body. Stimulates heart muscle.

IRON — For red blood corpuscles. Important to certain enzymes.

COPPER — Helps iron in blood formation. Activates certain enzymes. Needed for reproduction.

COBALT — For healthy intestines; Vitamin B_{12}; bone marrow.

MANGANESE— Needed for reproduction; milk flow; healthy intestines; bones.

IODINE — For thyroid gland which controls all bodily activities.

ZINC — Plays an important role in the digestion of carbohyarates.

WATER — Takes its proper place only when we realize that a body can exist longer without feed than without water.

FEED — Nature originally intended that the animal should get all the minerals it needs through its feed. Because of heavy cropping and erosion, our crops no longer contain them adequately. Additional minerals must be provided.

BONE MEAL AND GROUND LIMESTONE— Here is the easiest, most economical way to provide a complete mineral ration. In one side of a divided mineral box, put a mixture of bone meal and ground limestone, or their equivalent. These provide calcium and phosphorus in quantity as well as traces of sulphur, magnesium and potassium.

MORTON'S TRACE MINERALIZED SALT — In the other side of the mineral box, put Morton's Trace Mineralized Salt. This provides the chlorine and sodium of salt, as well as adequate amounts of iron, copper, cobalt, manganese, iodine, and zinc. Minerals are important to bone, blood, muscle tissue, and vital organs. They also help control the enzyme, vitamin and hormone functions that build nutrients into growth, heavy production and healthy young.

LIVESTOCK thrift and profits depend upon ALL seventeen of these elements. An extra supply of some never makes up for a deficiency of others.

Failing to get an adequate supply of any one, animals are not as profitable as they might be. They have difficulty in breeding. Calves are small. Litters of pigs are weak. Beef animals fail to make the best use of their feed. Dairy cows produce less milk. Sheep have thinner fleece.

Nature originally intended that animals should get *all* of these essential minerals in their water and feed. For the most part, that's no longer possible. Because of heavy cropping, and wind, sheet and gully erosion our soils are often deficient. Crops grown on those soils are likewise deficient. Moreover, because we have bred up our animals, because we expect more of them, they actually need more than even nature supplied originally.

The simplest, most economical way to supply all of the minerals is Morton's Trace Mineralized Salt in one side of a divided mineral box and a mixture of bone meal and ground limestone, or their equivalent, in the other.

This combination provides for the minerals which are needed in quantity — calcium, phosphorus, and salt. It also supplies, through the salt, the trace minerals — cobalt, manganese, iron, copper, iodine, and zinc, which are needed only in very small amounts.

In this way your animals get the minerals they need — the plan is complete. Fed free choice, livestock can take what they want and need — their instinct is an unerring guide. Your reward is healthier young, faster gains, bigger production of meat, milk, and wool, thriftier use of feed, and greater profits from your livestock operations.

It costs only a few cents more per animal per year to feed Morton's Free Choice Trace Mineralized Salt than salt alone — so little that every pound of salt fed to livestock should be Trace Mineralized Salt. Your dealer has Morton's Free Choice Trace Mineralized Salt in stock. Ask for it by name — feed it free choice.

FREE — Just off the press, this 32-page book gives you the complete facts on feeding salt and trace minerals to all classes of animals . . . shows how and why salt and trace minerals are so necessary for low feeding costs and maximum livestock profits. Mailed free and postpaid.

MORTON SALT COMPANY
P. O. Box 781, Chicago 90, Illinois

it's growing!

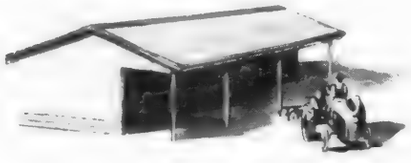
day by day, low cost

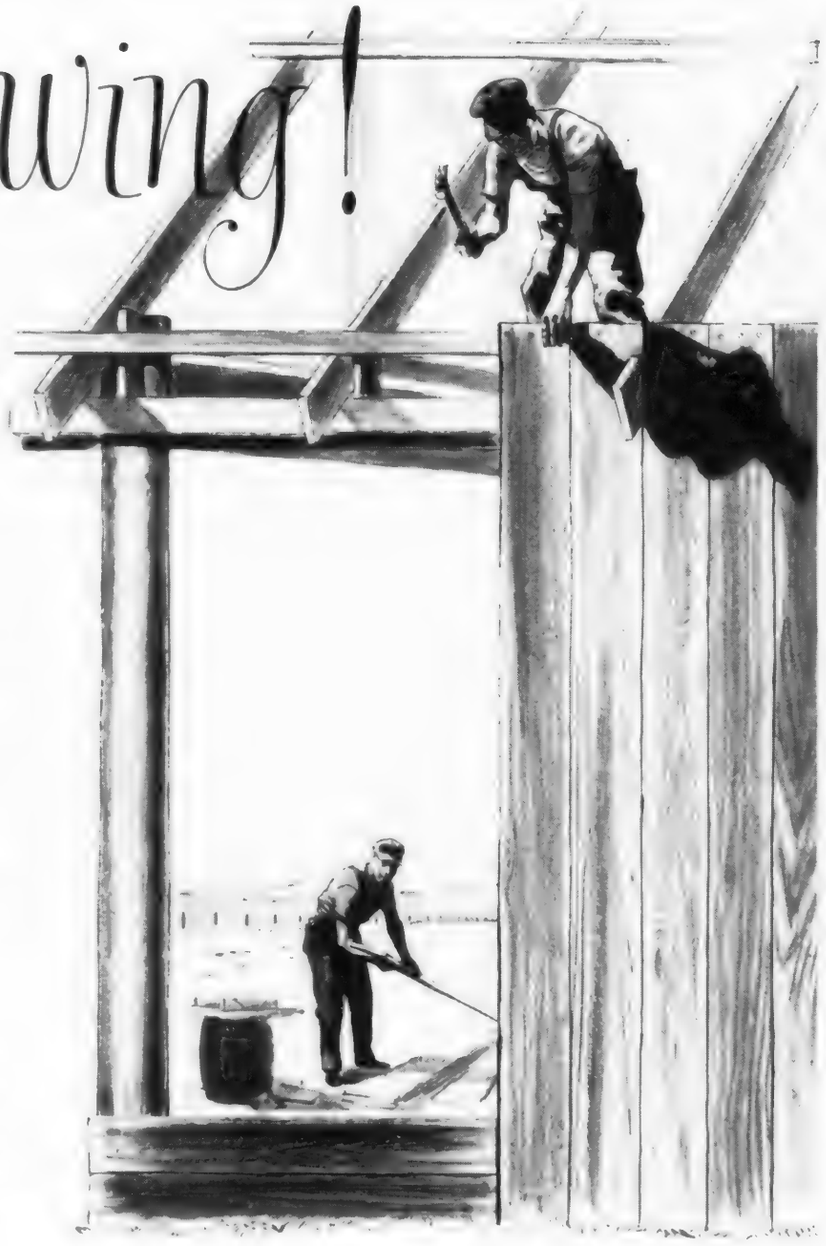
penta*

protected

barns and sheds

are becoming more popular





You can actually *save up to 30%* by using the pole-type method of construction! Of course you'll want the poles to have the very best protection against decay and termites to make your buildings last as long as possible—and that calls for PENTA protection.

PENTA is a *clean* wood preservative so that poles, posts and all the lumber you use can have complete protection and still be easy to work and pleasant to handle.

Over 60 commercial treating plants are located throughout the country, ready to supply you with PENTA-PROTECTED poles, posts and lumber. Or you can treat them yourself, as recommended by over 52 state and federal agencies. See your county agent.

THE DOW CHEMICAL COMPANY
MIDLAND, MICHIGAN

fence posts need
penta
protection, too

PENTA-PROTECTED posts will resist rot, decay and termites, and that makes them last longer. It costs you less to build the best fence because you save in repairs.

See your lumber dealer for penta **protected** poles and posts

The Dow Chemical Company
Dept. PE 50, Midland, Michigan

Please send PENTA information checked below:

- ☐ **Booklet "Before You Build Your Barn"**
- ☐ **Locations of Treating Plants**
- ☐ **Information on Treating Fence Posts**

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DOW
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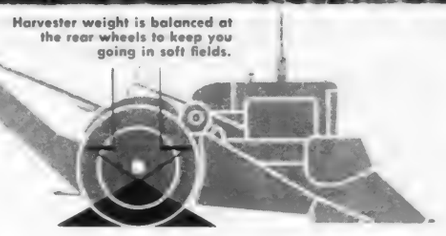
"the picking is good"



Harvester weight is balanced at the rear wheels to keep you going in soft fields.

SAVE MORE CORN BY TIMELY PICKING WITH YOUR OWN ALLIS-CHALMERS CORN HARVESTER

Here are the signs of "good picking" . . .

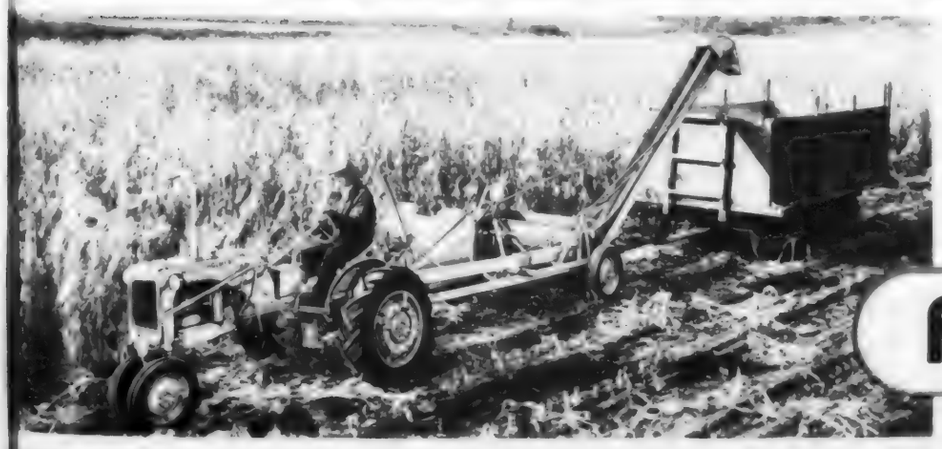
. . . Kernels hard-dented. Cobs tough and springy. Husks well loosened. That's the ideal time to start harvesting with your own Allis-Chalmers Corn Harvester.

In bad seasons, wait until your corn is ready, then pick in a hurry.

This compact, two-row harvester is *under*-mounted in less than 30 minutes on your WD or WC Tractor. Four-fifths of the weight is on the broad tires of the tractor's rear wheels. You get sure-footed traction to keep picking in muddy fields.

Long, low picking snouts lift down stalks and scoop in low-hanging ears. Revolving spider wheels direct the corn into kernel-saving, rubber-against-steel husking rolls. Spring-steel *pegs* husk with almost human action. Ears roll into the wagon while you sit *safely* in the tractor seat, with "all-clear" vision down the rows.

Ask your Allis-Chalmers dealer about this moderately priced two-row corn harvester. See for yourself how you can have more corn in the crib this fall.



One-row, Pull-Type Corn Harvester

The Allis-Chalmers one-row, pull-type Corn Harvester has the same corn-saving features found in the two-row mounted model. Light in weight, low-priced — operates with any make tractor.

ALLIS-CHALMERS
TRACTOR DIVISION—MILWAUKEE 1, U. S. A.

Land: $30 an acre

By R. J. McGinnis

In a cypress tree a mocking bird trilled a light-hearted song to celebrate the end of a week of rain. From the flat fields where the skeleton of last year's corn stood, the dark, musty swamp was drawing back its curling fingers of fog. It was early morning in May, 1950. Here on Magnolia Plantation, just south of Albany, Georgia, things were about the same as they had been for half a century.

The two-and-a-half mile square expanse was made up of swamp, sage, weeds and second growth timber. Long ago great fields of cotton had grown here; there were month-long houseparties in the big house at quail and turkey hunting time. As the soil wore out, cotton retreated, and the swamp trees crept back into the fields. Only a few negro families scratched at corn patches.

Then on this morning in May, a new sound was added. The staccato bark of a diesel "Cat" rolled across the flat fields. A St. Louis businessman, Wade T. Childress had bought Magnolia Plantation for an average price of $18.00 an acre. This was the start of a new kind of farming.

Today Childress looks out from his screened farm office and watches his combines bring in oats. "We like southwest Georgia," says Childress, "because it has all year pastures for cattle and good general farming opportunities. We like the people, the climate and the way of life. Besides, I've enjoyed shooting quail around here for years."

Of Magnolia's 5,240 acres, 2,500 is open land, the remainder is swampland. The land in swamps cost $6.50 an acre. This year a logging contractor made test cuttings of hardwood in Childress' swamps and came up with a figure of $20 net return from an acre in areas where the timber has not been cut for 20 years. "If they can log for several years we can make the swampland help pay for the rest of the farm," says Childress. "It takes a man with special equipment—big crawler tractors and winches to pull the logs out. Those fellows don't think they're wet unless the water is up to their belts. They must be immune to water mocassins and rattlesnakes."

Childress has permanent fences around 500 acres of pasture land and will increase this to 800 acres in the next two years. He has spent $110.00 an acre in developing pastures and crop lands. This year he had 150 acres of oats of which 110 was certified seed. He took off 60 bushels per acre. He harvested 32,000 lbs. of certified Crimson Clover seed from his pastures and took off good crops from 70 acres of peanuts and 40 acres of corn. He has 200 acres in Coastal Bermuda and is putting in 250 acres more this year. Water is piped to all his pastures.

He has one of the largest herds of Santa Gertrudis in Georgia. On a Spring morning one of the finest views in all Georgia is his herd of 100 breeding cows, as like as peas in a pod, grazing on knee-high Crimson Clover in the pasture in

IN THE SOUTH children like to climb the graceful Mimosa tree and hide in its lacy blossoms; now the outlook from their leafy perch is changing. As far as the eye can see there are green pastures dotted with fattening cattle. To clip the weeds there are rotary mowers like the one above. Oil-fired dryers and metal storage bins make it possible to store grain without the 25% weevil loss.

Modern sights on Southern farms

(1) The South is blessed with plenty of water; in Georgia artesian wells make pasture irrigation possible. (2) Big, self-propelled combines are used to gather the abundant grain crops. (3) Trucks can make a short run to the elevators that are springing up. (4) The elevator at Leary, Georgia, new this year, has conveyor belts, grain driers and all the conveniences of one in Illinois. (5) In the spring the cattle go on pastures of brilliant Crimson Clover. (6) There is a fly in the ointment, in fact several kinds of flys. This calf is being treated for screw-worm. (7) Wade Childress' Santa Gertrudis cattle are put on Cat-tail Millet in June, for between-season pasture.

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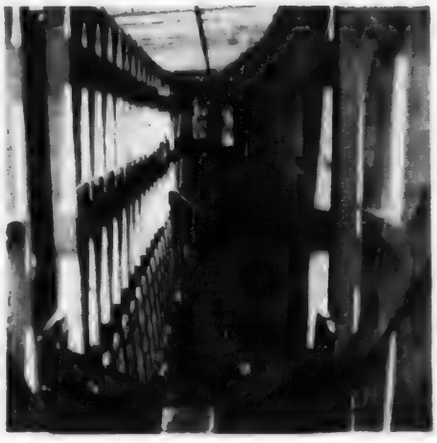

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front of the plantation home. He has five King Ranch herd bulls and 22 young bulls which can go far in upping the grade of cattle in south Georgia. He has, in addition to his Santa Gertrudis breeding herd, a commercial herd of 150 head.

"Magnolia Plantation starts to pay its way this year," he says.

Childress is a pioneer in a new method of farming who has the working capital the South needs.

Georgia, Alabama, Louisiana and Mississippi are the new frontier. Cotton is no longer king down there, for the boll weevil and depleted soils are pushing cotton to the West, to Texas and California. A vacuum was created which sooner or later was bound to bring in men with vision who could give worn out cotton land a change of diet.

This new diet is cattle and grass.

Costs

The formula for success in much of the South is simple: buy land low, put in good pastures, populate the pastures with livestock, let the livestock eat the grass the year round, and sell at a profit. This is a good formula anywhere, but today it's a little easier to achieve in the South than elsewhere.

For one thing, the price of land *is* low by national standards. As late as five years ago land with good possibilities was bought as low as $15 an acre.

The average price today for such land, regardless of the size of the unit, is $40: attractive acreage has recently been bought for as widely varied prices as $26, $25, $50, $42.50, $66 and $70. The general range for fair to good land is $25 to $50. If you strike an area where there is already a core of well-developed land, the price might be doubled. Prices have been going up slowly, and as yet have not leveled off.

How much more cash than the price per acre does a man need? One management company, five years ago, offered as a rule of thumb, $60 an acre additional on $40 land. Today, they say, this should be raised to as much as $85 per acre additional.

These development costs cover everything—livestock (a brood cow for every 3 to 4 acres of open land while the pasture is being improved), seeding and fertilization, machinery, fences, building repairs, labor, taxes, depreciation, and management. Thus, a 1000-acre unit would require $40,000 initial investment in land, and from $60,000 to $85,000 additional to make it a producing investment. And at that there would be a lag between investment time and the time the investor could cash a livestock check. Pastures are not built in a year. The payoff should start in about three years; in five years there should be a 15% net return.

The variables are the quality of livestock a man wants, the percentage of his acreage he wants in crops other than grass, his skill, and his ability to finance his operation until it begins to pay out. The small investor who has only the price of his land and who must do the work of developing it and stocks it sparingly may have long, lean years ahead; the big investor who is willing to plunge into Southern farming with a blank check gets quicker returns (and sometimes makes bigger mistakes).

TWO STAR PERFORMERS in Southern pastures—Crimson Clover and Costal Bermuda Grass. Between them they account for 8 to 9 months of the almost year around pastures.

The Tax Situation

One of the reasons why there have been large investments in Southern land is that it provides attractive tax features. Tax laws permit current deduction of operating expenses, and depreciation on improvements, depreciation of livestock used for breeding purposes. With good management the operation of nature builds up the value of livestock and the land itself, so as a result an individual in a fairly high tax bracket has much to gain and little to lose.

How does this work for an individual in a 60% income tax bracket, let us say?

The operating expenses of a farm, such as gasoline, labor, insecticides, fertilizer, are directly charged off each year. The costs of buying breeding livestock, fences, equipment, and some soil conservation practices are depreciated over several years. So, over a period of ten years these expenses are all allowed as charges against the farm operation, and as a result are deductible from the individual's current income. Say the total of these expenses is $100,000, the actual cost to an individual in a 60% bracket is $40,000 and the operations of nature are at work all the time to build up the value of the farm and the animals.

Since the land is being brought back from an unproductive state, the chances are it may not show a profit for 3 or 4 years.

Now, suppose at the end of ten years the owner decides to sell his improved farm. The farm cost him $50,000 when he bought it and now he gets $150,000 for it. He then is taxed on the $100,000 profit he makes on the capital gains basis. With today's tax law this would be, at maximum rate, 26% or $26,000. Thus, the owner would profit by $34,000.

We can carry the farm operation a step further in the tax relief direction. If the owner is engaged in raising breeding stock (not for sale directly to stockyards) he may sell any breeding stock that he has held for a period of 12 months or longer on a capital gains basis. This again reduces his tax on the profits from the sale of such stock to 26%, in contrast to his

60% regular income tax rate. Timber sales, too, can be reported as a capital gain: thus the high tax bracket man who owns one of these farms has a three-way chance at a tax saving by the capital gains basis: in land, cattle and timber.

Labor and Management

Common labor is plentiful and not too high, such as it is. The cotton field negro, accustomed to handling mules, must be taught new methods, but he makes a good tractor operator after a little experience; in general he lacks initiative and must have supervision. On the management level is where the shoe pinches. Local men who might be qualified for the jobs of managers, supervisors, and field men, even if they are college graduates, have been schooled in far different types of farming than the new cattle-grass system. They weren't born, so to speak, on the seat of a tractor: they know little about a grass economy and as little about quantity production of livestock. They do know how to handle the southern laborer.

Good managers are hard to find. Northern management men who are taken south are handicapped by a lack of knowledge of the new grasses and crop varieties they encounter, the technique of converting a cotton farm into a grass farm, the vagaries of Southern labor, fence posts that pull over sideways in the sandy soil when a stretch is put on them, and bugs and parasites the Yankee never heard of before, which make farming in the South as different from Corn Belt farming as a New England apple pie is from Southern corn pone.

If a man does not intend to do his own managing he would be wise to either find a good manager before he buys his farm, or else put the whole package in the hands of a qualified management concern. Even these people are finding managers first, then buying land for the managers to manage afterwards.

Gone to Grass

Bread and butter are going to come from cattle and grass. The row crops will become increasingly important as the fertility is built up, but the rotations will be much longer than elsewhere—grass five years as against one to three in the Corn Belt. Oats are especially an important crop because they are being used for winter grazing. This crop can be planted in the fall, grazed from December 1 until March 1 when other grasses and the legumes are in short supply, and yet produce almost a full grain crop. Yields up to 60 bushels are reported. Wheat is also being grazed: and the yields are in the twenties, with a few going into the thirties.

Guinea corn, an abundantly high green forage yielder, is being considered for cattle feed by J. Arthur Pancoast of Uleta, Florida. This year he plans on curing some of it and using the ground-up stalk and grain as a substitute for ground cobs in the feed formula offered by Roswell Garst, in *Farm Quarterly* for Spring, 1952.*

Ten-month pastures are an established fact in the South, although not one farmer in ten has the knack of managing them. Let's see how one man did it:

Half of Wade Childress' 5,200 acres is swamp: that is discounted for farming. You can't drain it. It remains a hiding place for water moccasins and deer: fish that have never seen a spinning lure glide through its clear, spring-fed streams. Herons and egrets fish from stilt legs in the water lilies on its edges. Every year the swamp encroaches on the farm land, and every November farmers set fire to the scrubby growth along its edges to push it back. There are rabbits in many a skillet during the "burnin' days" for farmers work with a shotgun handy to shoot the game chased out by the flames.

About once in 20 years a harvest of lumber can be taken off the swampland, then it sleeps, untouched, for another two decades—dark, wild and mysterious.

Land Clearing Task Force

A half dozen men armed with axes, bush knives, scythes, shovels: a tractor and log chains: a heavy truck equipped with a winch and long length of cable, made up the working force needed to clear the brush. With luck they cleared a couple of acres a day. A bulldozer was used sparingly and only on the larger trees: Childress didn't like the shell-like craters left behind when it pushed out trees. Scrub oaks, pine, Sassafras were removed, roots and all. The big stuff was chopped up and burned, the smaller weeds and leaves were left on the land to provide organic matter. And organic matter is the most needed item in Southern soils. Cotton took most of the humus in years past and now long months of rain and heat make it melt away in the soil.

As the land was being cleared hundreds of soil samples were taken and turned over to the Soil Conservation Service for analysis and recommendations of the State Extension Service.

The soil generally needs lime and Childress applied about a ton of locally crushed limestone to the acre, 6 months ahead of planting. Two years ago dolomitic limestone, high in calcium and magnesium, was not available, but now it can be bought from local custom spreading operators for $6.50 an acre, which is just what the local limestone costs. Just before planting, 1,000 pounds of 0-14-10, with 10 pounds of borax added, was spread and worked in with a disc. He gives his pastures 500 pounds of 0-14-10 every second year along with 100 pounds of nitrogen, spread in two treatments.

The pastures on the Childress place are mainly Coastal Bermuda grass, which has become the star performer for many Southern farms. This strain of Bermuda grass was developed by the Coastal Plains Experiment Station at Tiffton, Ga. Pasture experts there feel it will produce more Total Digestible Nutrients to the acre than corn. They have put on up to 500 pounds of beef per year with an acre of this spidery-topped grass. When well fertilized it

(*Continued on page* 108)

*Roswell Garst's Corn Cob Feed Formula:
14 Pounds of ground corn cobs
3 Pounds of ground shelled corn
1 Pound of soybean meal
3 Pounds of molasses-urea mix
(90% molasses — 10% urea)

THE SOUTHERN FARMHAND is no dairyman; here several watch while a Vet takes care of a first-freshener on the Rue Farm near Albany, Georgia.

BEFORE AND AFTER scenes on Magnolia Plantation, opposite page. Clearing the scrub trees, lime and fertilizer, fences, seeding and putting the cattle on the ground costs between $85 and $110 acre.
The farm home of C. W. Vines, supervisor on the Sunbred Farms near Reilly, Georgia is modern from the ground to the top of television aerial, a pleasant place to live.

By George Laycock

Apple Butter Bee

Aunt Ess Campbell recently received a letter from an 82-year-old lady in Florida, a letter which both amazed and saddened her. "She wanted to know how to make apple butter," says Aunt Ess. "Imagine a woman that old not knowing how to make apple butter yet. Said she'd trade us a recipe for making old-fashioned soap." Aunt Ess shook her head hopelessly.

"Why we've always known how to make soap," said Mark Campbell, her tall, wiry 73-year-old husband.

"We felt so sorry for her," Mark Campbell said, "We sent her a quart of apple butter and the recipe for making it."

In recent years the Campbells have heard from dozens of people who have either forgotten or never knew how to make apple butter . . . the kind made out in the yard in an aged copper kettle over a crackling open fire. And they have done their best to pass on to these needy cases full directions on the fine old art of apple butter making. In fact, Aunt Ess Campbell is rapidly gaining a nation-wide reputation for the apple butter made on their Pennsylvania farm near Valencia every year when October rolls 'round.

Last year apple butter from the Campbell's farm went to all corners of the country almost as fast is it could be ladled from the big copper kettles, cooled and packed. Several orders went across the country to California. Others went to such far-flung places as Florida, Idaho and Texas. When apple butter time came, cars came to their barnyard from as far as 200 miles away. These customers bought the fresh apple butter by the gallon.

These are customers who, for the most part, grew up on farms. They had eaten apple butter made by their mothers and grandmothers. And while the time-tested recipes had long since escaped them the spicy taste and pleasant smell of old-fashioned apple butter still teased their memories.

Aunt Ess Campbell considers the passing of this favorite farm delicacy one of the minor catastrophies of a changing civilization. There is little chance, however, that apple butter making will disappear entirely from the farm scene while she can still put apples in a kettle. "I've made apple butter for 50

(Continued on page 120)

"Apple Butter is part in the making and part in the eating," says Aunt Ess Campbell, an authority on both. Her young friend agrees.

A SEMEN DILUTER is made from the yolk of an egg and other material. Adding glycerine to the diluter has made it possible to freeze and store it without destroying the living sperm.

By G. W. Salisbury and N. L. Van Demark

DAIRYMEN are asking: "Why don't my cows settle like they did when I had a bull on the place?" or "Why did I get a run of bull calves when I switched to artificial insemination?"

Scientists look on artificial insemination as a brain child of science and ask questions in their own language, "What is being done to provide a constant supply of genetically superior sires for artificial insemination programs?" "On how critical a base is the actual selection of bulls now being done?"

Science now has a great new advance on the way, the perfection of a semen freezing technique which will be as great a step forward as artificial insemination was over the old bull ring. Before we talk about that, however, let's look at the program as it is right now—that is what the dairyman must work with today, tomorrow, and even next week.

The artificial insemination program is the fastest growing project on the American dairy scene today. In 1938 there were about 1,000 cows bred by this means in organized groups in the United States; five years later 185,524 cows were bred; in 1948, 1,713,581 cows; and in 1951, a total of 3,509,573 cows according to U.S.D.A. figures. By 1951, an average of 1,605 cows was being bred to each bull in the program. Similar growth records occur in the other leading dairy countries of the Western World.

The merits of artificial insemination, however, were not the sole cause of this growth. Since 1938 we have been on a rising economic trend. Labor has been scarce. Construction costs of safe housing for bulls on farms have been high. Milk has been in demand and generally has commanded higher relative prices since 1940 than it did before. A falling market might have given a different picture.

In spite of the rising market, 100 pounds of milk has purchased as much or more service in artificial breeding since 1938 than any other goods or services on the market. Breeding fees, seldom higher than $5.00 at that time, have increased at a much slower rate than the price of milk. The efficiency of the practice has increased tremendously since then. Advances in science, such as adding an antibiotic to the semen, changing the amount of egg yolk and citrates in the fluid used to dilute semen, using a photoelectric cell to help determine the concentration of sperm in the semen have all had their effect on raising the conception rate. Conception rates rose from less than 50 per cent in 1938, to a level of 65 to 72 per cent which is now common.

This improvement in first service conception has taken place in each state as the farmers learned how to use this new tool and as the technicians became more skilled in their work. In Utah, for example, the program started in 1948 with a conception rate of 50 per cent. In 1951 the conception rate had risen to 65 per cent. In New Jersey and other states where the program has been in operation for a much longer period, the conception rate for first services is over the 70 per cent mark.

In fact, present conception levels are higher than was ever thought possible in the beginning, higher than reported averages from natural service.

There is a turnover in the membership of artificial breeding units just as there is a turnover in membership of Dairy Herd Improvement Associations. Some dairymen drop out because they are dissatisfied. Some dairy herds are dispersed when the owner dies. It is our guess, however, that in areas where the artificial breeding service has been available for 10 years, a larger proportion of dairymen stick year after year than they do with D.H.I.A. testing.

Willard Loukins, of Clermont County, Ohio, dropped out of the program. "I bought a bull,' he said, "when we didn't get a single cow with calf after breeding all ten of our cows three times." The technicians at the Central Ohio Breeding Association said, "We strongly suspect that Loukins had some disease trouble, but he won't call in a veterinarian to find out."

A turn-about story comes from Roy Fliehman in neighboring Hamilton County, Ohio, who looks more like a professional athlete than a dairy farmer. "I signed up with artificial insemination as part of a bet. I told Don Schofield, the inseminator, that I had a cow that had been with the bull for over six months without catching. I told Schofield that if he got her bred, I'd join the Association. Well, he did, the cow did, and I did."

Schofield said, "With a hard breeding cow, timing is often the answer. Roy called me when she came in heat and I inseminated her at just the right time."

Probably more dairymen become dissatisfied with artificial breeding because some cows fail to conceive than for any other reason. Being human they forget that they may be at fault or that something may be wrong with their cow and blame the

IS ARTIFICIAL INSEMINATION

DOING A GOOD JOB?

THE ARTIFICIAL VAGINA, a Russian invention, is prepared for use by filling the liner with warm water (top). The semen-filled tube is passed into the laboratory (second) immediately after collection where a microscopic (third) examination reveals the number of living sperm. The technician threads the inseminating tube into the neck of the uterus (bottom).

inseminator and the bull stud. They even go to the point of condemning the program entirely.

Why do some cows fail to conceive? There are many possible reasons, a number of which the dairyman can control. First is the matter of giving the cow a chance to conceive. She will not conceive if she is not bred, and she cannot be bred if she is not watched and caught in heat.

A cow comes in heat just before an egg is matured in her ovary. A few hours after the heat period ends, the grape-sized sack in which the egg has developed, bursts and the egg is flushed by the liquid in the sack into the oviduct. If the cow has been bred, one of the millions of sperm finds the egg and unites with it in the oviduct and, after a journey through the oviduct into the uterus, begins the formation of the calf. After the egg has been shed, a material called the yellow body grows and fills the cavity in which the egg was formed. This yellow body produces a hormone which prevents the maturing of other eggs. If the cow has been bred and has caught, the yellow body remains and prevents the formation of other eggs while the embryo is developing into a calf. If the cow has not caught, however, the yellow body begins to shrink on about the ninth day after heat which permits the maturing of another egg. This ebb and flow of reproductive activity is controlled by the hormone secreted into the blood stream by the pituitary gland at the base of the skull. With these natural checks and balances at work it is not surprising that the time between heat periods is often irregular.

As the egg reaches maturity, another hormone, estrogen, is secreted by the ovary which causes the cow to become receptive to the bull. This hormone also causes an increased flow of the fluids inside the reproductive organs of the cow. One of the signs of the heat period which dairymen look for is the discharge of these clear fluids from the vagina of the cow.

Other signs of heat are general restlessness, bawling, walking the fence, holding up on a milking, and standing to be mounted by other cows.

Science has shown that the length of daylight influences the intensity of heat in cows. During the short days of winter, heat is less intense, and more care is needed to detect it. Not only are the signs less noticeable, but the cows are generally kept in the barn in the winter and can't show bulling, which is the surest sign.

"In the winter I can usually tell pretty well if a cow's in heat," one Wisconsin dairyman said. "When I throw the strap over a cow and go to putting on the milking machine—if she's coming in heat, she usually acts nervous and I start looking for the other signs."

Good record keeping helps, since the cow comes in heat at roughly three week intervals with the majority returning between 18 and 25 days if they are not settled. However, cows will occasionally return to heat at odd times and should be watched until pregnancy is certain.

Many successful dairymen follow the practice of calling in the veterinarian if the cow is bred twice and doesn't catch. He will check for disease and for physical causes. He will also check to see if she is one of the rare cows which come in heat even though they are with calf. He will treat each cow as an individual case; if she is beyond treatment, the dairyman can get rid of her and so save himself the expense of carrying a boarder cow.

Give a Cow a Rest

Another common difficulty occurs when dairymen try to rebreed their cows too soon after calving. The strain of carrying and producing a calf, which grows from microscopic size to near a hundred pounds in nine months, is great. The growth of the newly started calf is rapid. Conditions must be ideal at the start or the process may fail. Failure is likely to occur when a cow is rebred sooner than 60 days after calving. It takes nearly 50 days after a normal calving for a cow's reproductive organs to return to the normal non-pregnant condition. If the cow had trouble at calving, even more time may be required. Waiting at least 60 days after calving before attempting to rebreed will lessen chances of causing breeding troubles later in the pregnancy. Waiting also will increase the chances of getting the cow settled on the first service. With average conception rates, one can wait 60 days before starting to rebreed and still get an average of a calf per cow per year.

Many farmers are inclined to blame breeding troubles on improper feeding. Only occasionally is feeding likely to be responsible. As long as a cow gets enough to eat and the ration contains home-grown grains, good-quality roughage, bone meal, and salt, no trouble in breeding should be encountered that can be blamed on feeding. Except in isolated situations such a ration contains the energy, protein, minerals, and vitamins to meet all the feed needs for reproduction. Controlled experiments have failed to prove the necessity of feeding supplementary vitamins under normal farm condi-

(Continued on page 122)

THE CALF EMBRYO grows from microscopic size to 70 or 80 pounds in nine months. To take part in such phenominal activity the uterus must be given at least a 50-day rest between calving and rebreeding. The red buttons are the points at which the calf's blood vessels pick up nourishment from the mother. There is no exchange of blood between the two.

An 80 day calf fetus
photographed by
the Dairy Science Department
of the University of Illinois.

WHAT ABOUT

Winter-hardy oats eliminate the uncertainties of spring sowing. They are big producers when they hit.

ANDREWS, a spring oat (left), and Atlantic, a winter-hardy variety (right), are recent additions to Kentucky oats varieties.

WINTER OATS?

A FARMER may condemn blue grass as it turns brown in July, and fescue on general principles, but it is a rare man, indeed, who has harsh words for oats. Farmers like oats: they are easy to handle, don't take too much attention, provide excellent straw: they're, generally speaking, a good crop. Nevertheless, their popularity has suffered a decided setback throughout the corn belt and the oats belt during the last few years. Nobody has ever claimed that their early spring planting date was at all advantageous and because farmers haven't been able to get oats in early enough, their yields have been dropping. In fact, yields have dropped so much that they have counteracted all the other features that formerly made oats look so attractive.

But in the South and in lands along the lower reaches of the Ohio River new varieties of winter hardy oats are promising interesting results. Winter oats always have been high yielders—when they hit. The Weiss Brothers in Sumner County, Tennessee, just below the Kentucky border, have made over 145 bushels per acre and 120 bushels per acre yields are not uncommon in that part of the country. Trouble is, these winter-hardy varieties have never really lived up to their name, and while they have shown these phenomenal yields in good years there have been just about as many seasons when the crop was lost. There is the problem of lodging, too, for winter-hardy oats have notoriously weak straw. If it weren't for their tremendous yields and their importance in good rotation practices it is quite likely they would long ago have been forgotten in the northern section of the winter oat belt. Their good performance, though, has demanded attention, with the result that increasingly better winter-hardy strains are being developed.

One of the most recent is Atlantic, a yellow oat bred from a cross of Fulwin x Lee-Victoria at the U.S.D.A. Beltsville Experiment Station and subjected to exacting tests throughout the states of Georgia, North Carolina, Virginia, Kentucky and in other winter-hardy nurseries whose work is coordinated at Beltsville. Of the parent stock both Fulwin and Lee possess fair to good characteristics for winter hardiness but produce straw of poor strength and are susceptible to the various races of stem and crown rust. An infusion of genes from the Victoria strain has added strength to the straw of the new oat and has endowed it with considerable resistance to rust.

Trying to breed any new strains of grain is tedious business that requires anywhere from 8 to 16 years of painstaking observation, experimentation and research. To come up with one of these winter-hardy varieties of oats is a particularly tough job. The Tennessee Experiment Station notes that the most important criterion for judging the winter-hardy character of oats is the ability of a variety to retain its dormant seedling growth under variable winter temperatures. Failure to do this will cause the oats to develop a spring habit of growth during intermittant warm spells in mid-winter only to be killed by the cold spell that follows. The University of Kentucky Experiment Station, tried some 1800 varieties out of 4500 in the U. S. Department of Agriculture's "World Collection." Of these, only 70 were able to survive winter weather and only about 25 came through with any kind of a stand at all.

Atlantic was one of the varieties that turned in the best performance in the nursery. In the fall of 1951 it was released to Kentucky farmers for commercial production. Bill Duncan, who raises a lot of livestock on his three farms near Hopkinsville, was one of the first to try it.

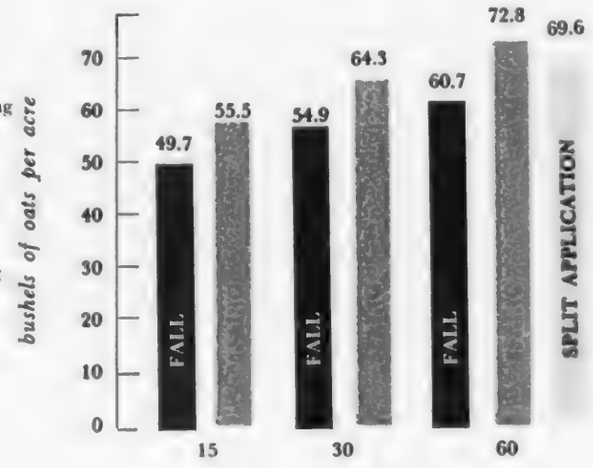
"What I'm looking for," says Duncan, "is feed. I need plenty of pasture and plenty of feed. The field I had in Atlantic oats this year is one that has been in a small grain-lespedeza rotation for nine years now. I used to use wheat and lespedeza, but I've substituted oats for the wheat.

"Until last fall I had sowed either Forkedeer or Fulwin oats in early October; didn't pasture them at all; sowed lespedeza on the oats very early in the spring; combined the oats; pastured the lespedeza during the summer, disced it up and put it back into oats again in the fall.

"I did the same thing last fall with Atlantic, only I drilled the oats the last of September instead of early October. You have to give it a chance to get a good start in life before winter weather sets in.

"Some claim you have to put more seed in the ground, too, with these winter varieties to get a good survival. I doubt that thicker planting will do much good, though. It's like my father-in-law's advice on fishing. He said he never fished with more than one pole: if the fish were biting

(Continued on page 115)



TENNESSEE experiments prove the superiority of spring applications of nitrogen for fall-sown oats.

OPPOSITE PAGE—Winter-hardy oats are tremendous yielders on southern fields. Plant breeders are producing varieties with stiffer straw to eliminate the lodging seen here and have advanced the growing area of the fall-sown varieties north of the Ohio River.

A Milkhouse must fit the local Grade A ordinance. Here are the essentials for building an approved milkhouse

GRADE "A" MILK HOUSE

By Fred Knoop

GRADE A MILK is no longer a product of dairy farms that want to do "something extra." It has come to be the yardstick which good dairymen use to measure their own farm milk quality. Most metropolitan milksheds insist on it. Even the more isolated areas have set up milk ordinances that make it the only type of milk that can be shipped from the farm—legally.

Since more of the steps in the production and storing of Grade A milk take place in the milkhouse than at any other point, it is easy to see why a milk sanitarian makes a bee-line for it when he checks a dairy farm. In the Grade A set-up the milkhouse is used to strain, cool and store the milk. Here, too, the utensils and cans are washed, sterilized and stored. If a dairy farmer doesn't have a Grade A milkhouse now, he may find that it will soon be a necessity. It should be planned ahead of time for it is a considerable investment, and it takes a lot of thought to make it work smoothly.

Where to Build It

"Finding the right spot for our milkhouse was the toughest job of all," says Mark Boetch, a dairyman who ships into Philadelphia. We have a bank barn and our milking room is on the lower level. To load a milk truck, we have to drive alongside the upper level. So we solved the problem by putting a covered concrete ramp up from our milking room to the milkhouse, which is on the upper level. Using a two-wheeled can cart, it is easy enough to pull the milk up the ramp to be strained and cooled in the milkhouse. When it's ready to go to town we load onto the truck, directly from the milkhouse level."

Boetch's solution is one that will work for a bank-type barn. Each farm will have its own peculiar problems but there are basic rules which apply to any milkhouse.

Before doing any digging for a milkhouse foundation, it is a good idea to sit down and do some careful planning; think ahead of any changes that may be made to the dairy in the next few years. If an expanding herd might make it necessary to build a new loafing shed on the same spot as the milkhouse, or a new silo might best be located on the ground where a concrete milkhouse is firmly established, it does not improve anyone's disposition to have to tear the milkhouse down and rebuild it a few feet away.

The milkhouse should be on the clean side of the barn, clear of the barnyard, silo and pig department. An approved (by the local health authorities) septic tank and waste disposal system must be provided. In locating the milkhouse waste disposal system it is important to keep in mind that it should not conflict with wells or existing sanitary facilities.

Water for the Milkhouse

A milkhouse requires a good supply of clean water and this should be piped to it; this is often better than locating the milkhouse near the well to save the cost of trenching and a pipe line. For, unless a milkhouse is located so that it helps streamline the milking chores, it can become a tail that wags the dog.

To produce high-quality milk, it should be strained and cooled right after milking; most milk ordinances require that the straining be done in the milkhouse. That is another good reason for having the milkhouse close to the milking room.

In no case should the barn open directly into the milkhouse. Most milk ordinances require two self-closing doors and at least a six-foot passageway between the milking room and the milkhouse. The milk should not be carried through feed rooms, loafing rooms, or any animal section of the barn in order to reach the milkhouse.

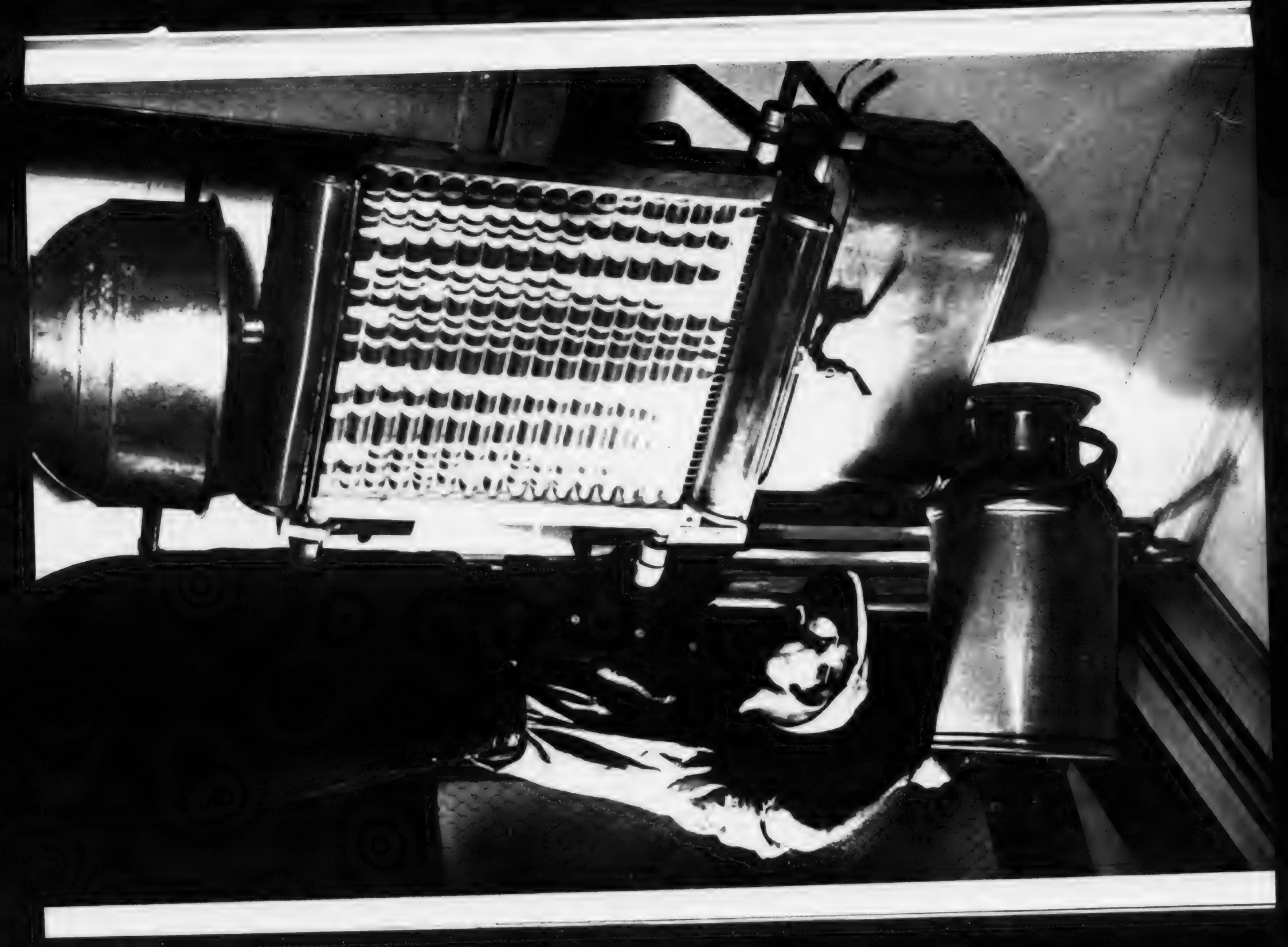
A milkhouse that is attached to the barn will be approved by most inspectors if there is a good solid wall separating the two buildings. It can be located at either end of a center alley type barn. For a large herd of 20 milkers or more, the milkhouse should be placed near the center of the milking unit to save steps.

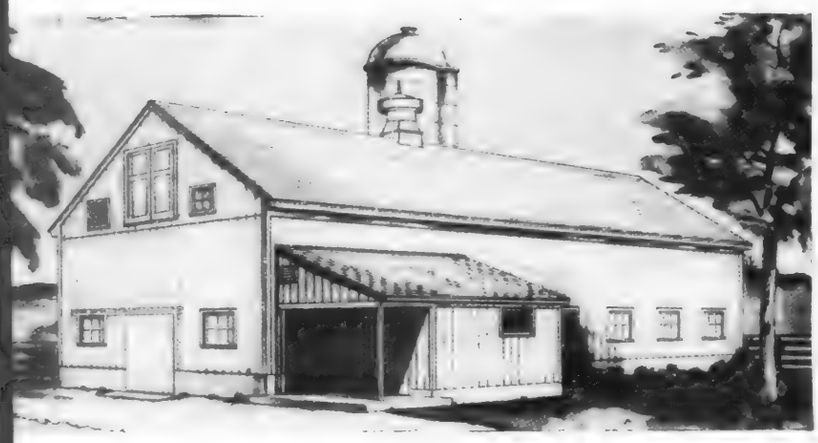
If the new type of milking parlor is to be used, the milk-cooler side of the milkhouse should be close to the milking equipment to keep the length of the milk pipeline as short as possible. The problem of cleaning the pipe and the cost of the pipe both add up when it is stretched out.

How Big?

The smallest milkhouse recommended is one 10 by 12 feet; this will take care of a small herd. The bigger the herd, the bigger the milkhouse. The piece of equipment that usually determines the length of the milkhouse is the milk cooler. The cooler should be large enough to handle both morning and night milk cans during peak production. Some people like the idea of cooling milk with the bubbling water from an ice-cold spring. It is picturesque and it does save money to let nature do the cooling. Unfortunately, ice-cold spring water usually turns out to be 55 degrees (or higher) in hot weather and that won't cool the milk down to a temperature that slows bacteria growth for

AN AERATOR-COOLER takes the animal heat out of milk in a matter of minutes. This medium size cooler brings 10 gallons of 90 degree milk down to 46 degrees in 8 minutes. From here it goes into the farm can cooler for storage. "It's one more piece of equipment to wash," says Lyndon Gray, the dairyman shown here, "but it is worth it to keep the bacteria count down." Many states require covers over the tube area; here they have been removed to show the flow of milk.





THIS IS small milkhouse designed to take an 8-can cooler. It has a covered passageway from the barn to the house, and loading can be handled from this area. It can be built of any material, to fit the existing barn.

PLAN

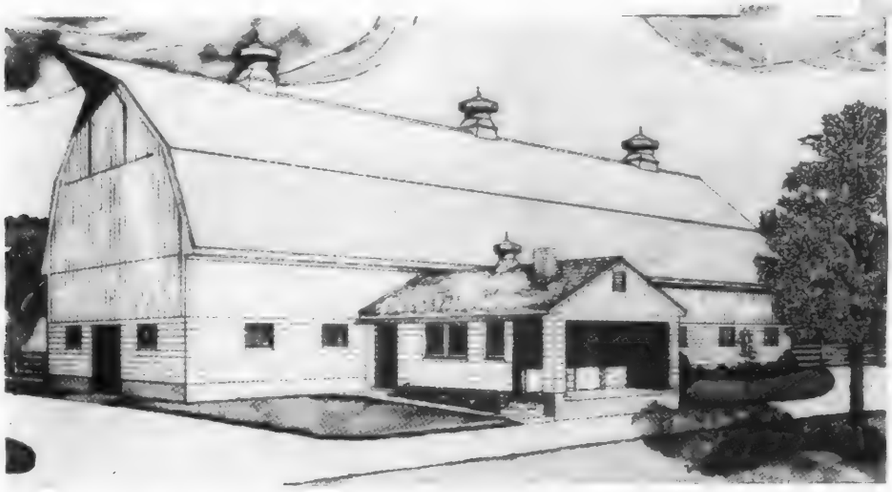
Size of building	**10′ x 16′-6″**
Net milkhouse floor area	**104 sq. ft.**
Ventilating duct size	**10″ x 12″**
Cooling tank capacity:	
Water	**4 cans**
Mechanical	**6 cans**
Total can storage	**12 cans**
On double can rack	**8 cans**
Under shelf	**4 cans**

3 Windows: 6-light sash, 1⅜″ thick; glass size, 10″ x 12″.

PLAN

Size of building	18'-8" x 29'-4"
Net milkhouse floor area	250 sq. ft.
Ventilating duct size	16" x 16"
Cooling tank capacity:	
Water	16 cans
Mechanical	18 cans
Total can storage	25 cans
On double can rack	20 cans
Under shelf	5 cans

Windows:
3 6-light sash over cooling tank
2 9-light sash over wash vats
1 4-light sash in washroom
1 4-light sash in heater room
Glass size, 10" x 12"; sash, 1⅜" thick.



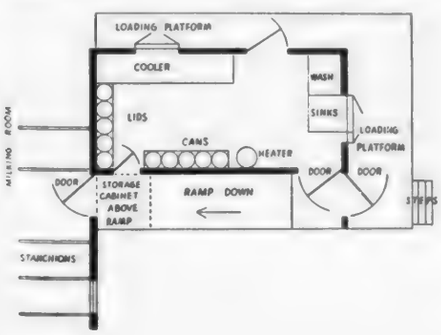
A MILKHOUSE designed to handle the milk from a large herd; note that it has been placed in the center of the barn to save steps. An attached milkhouse has the advantage of making possible a covered passageway from the milkingroom to the milkhouse. This should not be less than six feet and must have self-closing doors at each end of the passage way to meet Grade A requirements.

many hours. So, for most new milkhouses a mechanical unit should be considered. Manufacturers can give the exact dimensions of the various models and the milkhouse can be laid out to accommodate them. Allow space for the double wash tank and water heater on another wall. If the water heater is put close to the wash tanks it saves heat and time, for it will then take only a couple of seconds to have hot water running out the tap. If possible, locate the cooling tank on the north wall, away from direct sunlight. This saves power and increases the cooling efficiency. The wash tanks should go on the southern exposure, preferably under windows. The glass window area in a milkhouse should not be less than 10 per cent of the floor space area. Glass in the outside doors counts in this 10 per cent.

Doors should be big enough to allow the cooler to be taken in and out. If you don't like the expense of having a big door made (3'4" is the minimum size recommended) a false wall can be built out from one side of the door frame and a smaller stock size door can be used. The false wall should be secured with lag screws so that it is easily removed when installing or removing the cooler. Screens must be provided for all doors and windows which will be open in the Summer. All doors should be outward opening and equipped with a self-closing device.

Storage racks, separators, wash and rinse vats and a vacuum outlet for washing the milking machine should all be located accurately on the plan. Floor drains and water pipes can be located under the floor and insulated by laying them in one of the new materials such as Vermiculite.

It is not a waste of time to get every detail of the milkhouse down on paper and then get the local Board of Health official to sign it as approved. Officials change, but a milkhouse is built to last a lifetime: a written "OK" is the best answer to the new inspector's question, "Who ever told you this is an approved milkhouse?"



THIS IS the way Mark Boetch solved the problem of connecting his Pennsylvania bank barn to the milkhouse. The covered passageway that connects the milking-room with the milkhouse is indicated by the dotted line on the picture on page 46. The slope of the ramp is gradual and the milk is easily moved from the milking-room to the milkhouse for straining. The floor plan is shown at the left.

Heating . . . the Dairyman and the Water

The hot-water heater will provide some heat for the milkhouse. The motor and compressor of the milk cooler will also put out heat—when they are running. The catch in counting on the compressor for heat is that when the weather is cold, the compressor won't be called on to do much cooling, and so the heat won't be available. Some efficiency-minded dairymen are using their hot-water heaters to supply hot water to a space heater overhead; this blows the heat around with a fan. Another more complicated heating method uses a heat pump to convert the heat from the milk cooler compressor into useful heat for the milkhouse.

Where a large volume of milk is cooled, this method of heat conversion will do a good job. Then there are the infra-red heat lamps which can be installed above wash sinks to supply heat during wash-up time. These warm the neck but don't do much about cold feet.

There's nothing like a comfortable, warm room to encourage a man to do a good job. Many a piece of milking equipment is given a lick and a promise instead of a thorough clean-up, simply because the dairyman was too cold to see the job through.

Efficient fan-type electrical heaters, like the heavy-duty "Chromelox" heater distributed by C. A. McDade, Pittsburgh 8, Pa., heat a small milkhouse in a few minutes. Electromode Corp. of 45 Crouch St., Rochester, N. Y., and the

A MILK INSPECTOR looks into everything. This is Tom Batsche of the Cincinnati Board of Health scoring a dairyman. The point in question is the temperature of the water in the can cooler. A good ice bank and water at 35 degrees will help eliminate the chance of bacteria building up during the storage period.

HOW FAST DO BACTERIA MULTIPLY?

At 40°F.*	*There was no increase of bacteria*
At 50°F.	*The increase was very slight*
At 60°F.	*Each bacteria produced 15 new ones*
At 70°F.	*Each bacteria produced 700 new ones*
At 80°F.	*Each bacteria produced 3,000 new ones*

* Samples of the same milk were placed at varying temperatures, and at the end of 12-hour tests showed results as above. Tests conducted by M. J. Prucha, University of Illinois.

MILK UTENSIL wash-up should be the responsibility of one man on a dairy farm. If the milk is clean he gets little credit, but if it doesn't pass inspection it's all his fault.

A GAS-FIRED space heater is an efficient way to heat a milk house, because of the speed with which it works. This one is equipped with a thermostatic control.

Radex Co. of Hudson, Wisc., also specialize in milkhouse heaters. For large milkhouses an oil-fired unit can be used to furnish both heat and hot water.

Other types of quick heat for a milkhouse are the gasfired unit heaters. These are hung from the ceiling and used with natural or L. P. gas. They have their own thermostatic control and are made in a variety of sizes by Reznor Co. of Mercer, Pa.; Herman Nelson of Moline, Ill.; Fedder-Quigon of Buffalo 7, N. Y.; McCord Corp. of Detroit 11, Mich.; Buffalo Forge Co., 500 Broadway, Buffalo, N. Y.

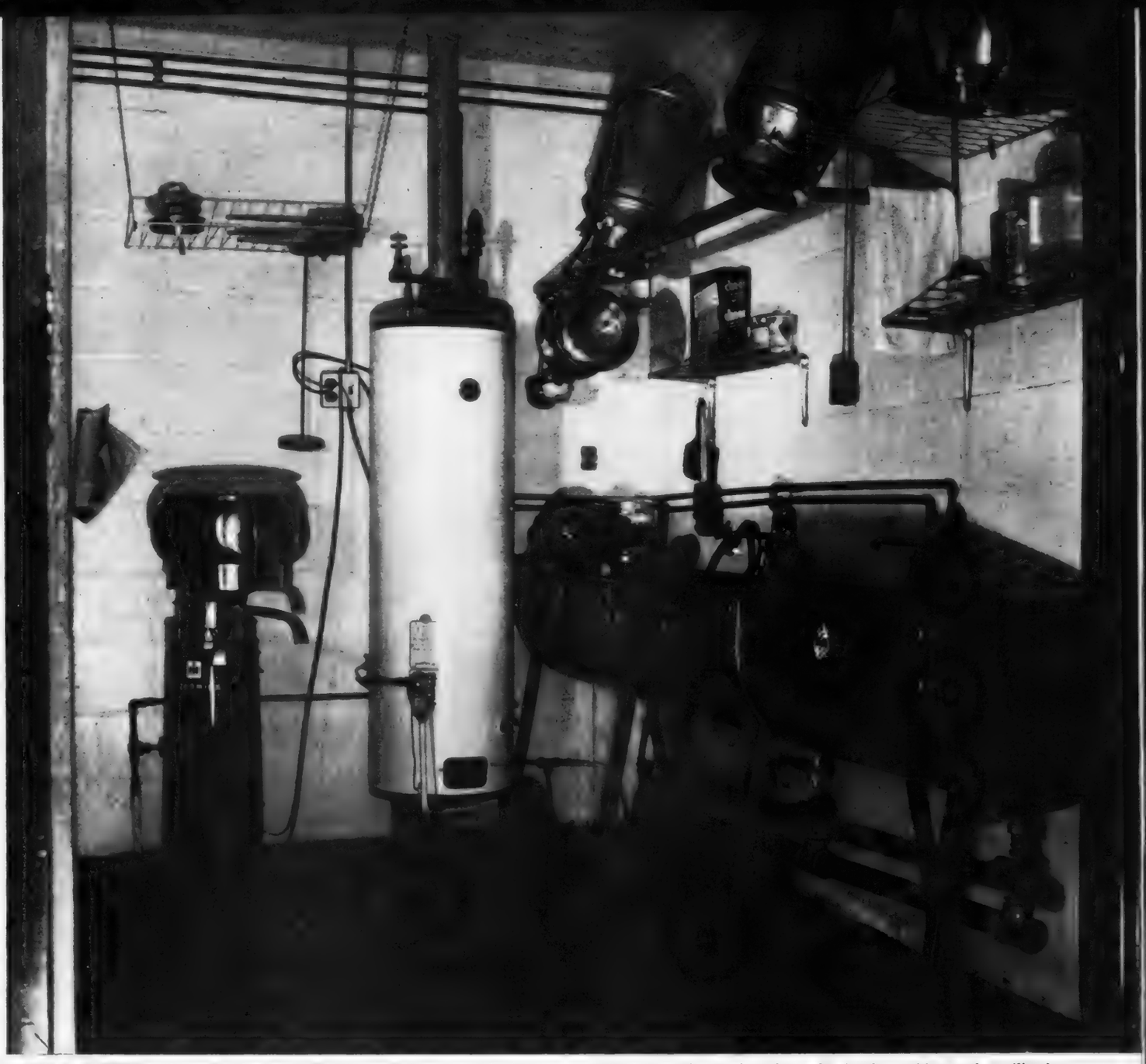
The proper use of heat and cold in a milkhouse is the double-edged blade that helps cut bacteria formation. Hot water is necessary to meet the requirements of any milk code. There are good hot-water heaters of the pour-in type that cost as little as $69. These are powered by electricity and give you a bucket of hot water when you pour a bucket of cold water in the top. If hot water is to be used for washing utensils and cans, cleaning udders and providing an extra bucket for the veterinarian and inseminator, a milkhouse should have at least 20-gallon heater. Milk ordinances call for a supply of hot water. On most heaters the right temperature is maintained with a thermostat.

If electric rates are reasonable an electric heater provides a trouble-free supply of hot water at low cost. Electric heaters can be installed with a special meter so that the bulk of the heating is done during the night at off-peak rates. For milkhouse use it is important that the heater also be hooked up so that it will throw in a switch during the daytime if the water gets below the minimum temperature which is acceptable for washing equipment. The average cost of electrically heated hot water for small milkhouses in the Midwest will be under $5.00 a month.

L. P. gas and natural gas hot-water heaters may be more convenient in some parts of the country and the cost will be in line with electricity. There are also oil pot type hot-water heaters which operate on a thermostat control: they burn either kerosene or No. 1 fuel oil.

Floors

If the milkhouse is of frame construction the concrete foundation should be extended up the wall at least 22 inches. Approved floor materials in most states are concrete, brick or tile laid so as to be impervious to liquids. The floor should be tight and smooth but not slippery. The junction of the floor and walls should be curved and the corners rounded to avoid angles that collect dirt. Drain pipes should



A MILK HOUSE built to Grade A specifications. Only two wash sinks are required but this one has three, for bottle washing and sterilization. The cans are dried on metal racks, and the strainer and lids are placed on wire shelves which allow free circulation of air. Notice that the electrical wiring is carried in conduits to outlet boxes.

be carefully set before the floor is laid. The floor must slope at least ¼ inch per foot toward the drain, and should be underlaid with 6 inches of coarse gravel to prevent heaving in the winter.

Walls and Ceiling

Construction may be of wood or masonry, but to be satisfactory the walls and ceiling must be properly insulated. The ceiling should be covered with 4 to 6 inches of loose insulating material and the space between the studs of the walls of a frame structure should be filled with insulation. Milkhouse walls require a vapor-proof paper or paint on the interior of the walls to keep the insulation dry. The walls on the inside of milkhouse must be of a smooth surface; tile and concrete blocks are often used. Du Pont, The Tycor Division of the Borden Co. and Truscon Laboratories are among the suppliers of industrial paints that will resist the moisture and fumes present inside a milkhouse. Outside walls will also require a good paint. With the proper paint they can be made completely water-proof.

Wall footings should go below the frost line. To prevent frost on the foundation, the outside grade should be carried to the top of the foundation.

A ceiling ventilator flue of not less than 100 square inches must be provided; this should have a fly screen in it. To suck steam-laden air out at high-speed a ventilating fan can be placed in the attic or in the flue itself.

The best electrical wiring hookup that a farmer can get—or afford—is none too good for a milkhouse, for the moisture, heat and cold will wreck ordinary house wiring equipment in a short time. If the outlets are planned before the ceiling is put on, all the wiring can be above it; this makes a neater job and protects it from the moisture. Wiring in the milkhouse proper should be put in conduits. All electric motors should be grounded. It is no extravagance to have milkhouse wiring done by an electrician. He can connect the larger motors to a 220-volt line, which will give a lower cost of operation. His electric wiring job should satisfy the inspector from the power company and your insurance man.

How Much Will It Cost?

A concrete-block bilkhouse will cost in the neighborhood of $1.75 a cubic foot if a contractor does the job. If the farmer does the job and has only materials to buy, the cost may be kept down to $1.00 a cubic foot. A 10x14-foot milkhouse with an 8-foot ceiling would cost about $1,000

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THE GOOSE MAKES A COMEBACK

Since berry-raisers discovered that geese like crab-grass better than anything, there have not been enough of them to go around.

By Josephine Neel Wallen

THE GOOSE is hanging high again. That is good news not only for geese, but equally cheering information for farmers who want their gardens and fields freed from stubborn crab grass—than which there is nothing more stubborn, unless it is a goose herself. Somehow it was discovered only recently that this fowl will eat and enjoy the long-rooted, tenacious crab grass which is so pesky to get rid of. All of which means that new fields literally have opened for the goose, and the demand for these hardy birds far exceeds the supply. If one is interested in saving his own back and economizing on labor costs by employing a flock of strong-billed, strong-willed geese to clear his land, the first step toward becoming a goose-herd is to plank down from $4 to $6 per head for them.

Soon after it was reported that the use of geese in the strawberry growing counties of Tennessee "could save a grower as much as $50 an acre on labor costs, using four geese per acre," the Market Bulletin's poultry column was filled with ads, "Geese Wanted." In the Portland, Tennessee, area there are about 3000 acres in berries, and about that same number of birds is being used.

From West Virginia came a report extolling the virtues of the goose in the strawberry fields of that state. One grower, who called geese "the poor man's hired hand," pointed out that the industrious birds would not eat the green berries, and could be left in the patches right up to the time the berries begin to ripen. Sometimes they helped themselves to ripe berries. However, from June to September is the time they are usually needed in the fields. The only trouble with the goose taking over man's work, some growers say, is that such a practice will result in an increase in acreage planted to berries, then overproduction and a price decline. But the plan, promoted by county agents, has caught on so well that authorities predict that it is just a question of time until the goose puts a short-cake on every man's table.

Not since the feather-bed era has the goose done so much for man. Before the days of innerspring and airfoam mattresses, there were no sadder words of tongue or pen than those of the old song, "Go tell Aunt Rhody her old gray goose is dead, that she's been saving to make a feather-bed." For that was a time when a woman was not only expected to make her own bed, but to lie in it, too. When the housewife of yesteryear stopped being a mattress-maker and turned the chore over to man, both man and goose went into a decline. Poets dreamed of being pillowed in "scented down," but modern bards don't wax sentimental over coiled springs and air cells.

During the feather-bed era, all enterprising maidens with matrimonial intent stuffed a feather tick for their hope chests after ascertaining, with many blushes, whether the one who had proposed to share it, preferred a tightly or loosely stuffed bed. When things had gone that far, the young man in question knew he was a "gone goose" and jokingly confided to his cronies that his goose was cooked.

The goose that laid the golden egg was not valued more highly than the one that gave up its soft, downy underfeathers for beds, pillows and bolsters; and its quills for writing purposes—"Nature's noblest gift," according to Lord Byron. And many of our grandmothers have been known to save the lives of children strangling to death with diptheria, by tickling the throat with goose feathers.

In addition to contributing feathers for man's blissful hours of repose, food for his table, and quills for transcribing his thoughts, the goose furnished our forebears with grease. Goose grease, like mutton suet, is not likely to become rancid as quickly as other fats. Before the days of an electric refrigerator in every kitchen, this was quite an advantage. Mixed with other concoctions, from onions to honey, and sometimes rose-scented, it was widely used in domestic medicine as a household remedy for many of the ills that plagued

GEESE AND DUCKS are happy to occupy the same pond, but they each maintain their own navy. Rank and privilege are clearly defined, and the best tadpoles go to the captains.

SIX TO EIGHT GEESE are used to keep an acre of berries cleared of crabgrass. During the green stage a goose will pass up the berries to eat the grass. Once the berries are ripe and juicy geese have been known to sneak a few to eat for dessert.

the hardy pioneers who, incidentally, used a goose bone as a means of forecasting the weather. Today, in many parts of the country, the flight south of the wild geese is regarded as an indication that a bad cold spell is not far behind.

Since earliest times, people have taken the name of the goose, but not in vain, and given it to places, things, manners and customs. In so doing, the goose's cognomen has been both honored and desecrated. Goose as a prefix has become a highly descriptive word of every day parlance throughout all parts of the country; although slang expressions and colloquialisms are heard more often in certain localities.

"A tongue as slick as goose grease," is one of the colorful expressions inspired by some outstanding characteristic of that once favored fowl. David Crockett called a man whom he did not like " a gander-shanked Yankee," a most derisive term, if one is familiar with that portion of the bird's ungraceful anatomy.

The goose was such a vital part of the every day lives of our ancestors that he found his way into their literature as well as their speech. From Mother Goose Rhymes, the bold, boisterous bird wandered on through fables, stories, and even into poetry. The ancient Egyptians immortalized him in pictures on their monuments. Alfred Lord Tennyson gives us another picture of him not quite so flat-

(Continued on page 118)

Hunters and Farmers

By Carlos Vinson

Can the farmer get along with the increasing army of hunters that descend on him every fall? Here's how a number of states have solved the problem.

ONE November day, three years ago, a big Buick stopped in front of Joe Wetherly's place in southern Indiana and a man got out and went to the door. He said he and his two friends would like to hunt over Joe's farm.

Joe came out and walked to the car with the man; said he'd rather not have hunters, since his livestock was scattered all over the place. But they each gave him a cigar and one of them offered him a drink out of a pint flask he had in his hip pocket. They seemed like nice, reliable fellows, with expensive clothes and guns. They had three dogs with them. Joe reluctantly said they might go ahead if they'd be careful.

He heard them banging away all day. He thought it rather strange that they didn't even wave good-by when they left that evening, but he soon found out why. The more he found the madder he got. For the next three days Joe was busy adding up the damage they had done on his farm. Two of his wire fences were cut; three gates were left open and his hogs had wandered off to another farm; a neighbor told him that he had seen one of the hunters shoot at a covey of quail in a thicket, and Daisy, Joe's favorite milk cow, had stuck her tail straight up and charged out of the thicket, her backside full of birdshot; his old gray tom cat never did show up after that.

So Joe swore that never a hunter would hunt on his place again. He posted his farm, advertised it in the county paper, and kept a sharp eye to see that no one sneaked in on him.

The country is full of Joes; and the country is full of hunters like the ones who visited Joe's farm—reliable, sober businessmen who don flannel shirts, fill their belts with ammunition, slip pint bottles into their hip pockets, and drive to the country for a day's sport. Once they are loose in the country they become irresponsible vandals on a holiday. A few swigs of firewater, which seems to go naturally with hunting, makes the most reliable of men slightly trigger happy. It's no wonder that hunter-farmer relationships are falling apart at the seams. More than ten million hunters took to the field last year, only a few of which hunted on their own property. Almost all had to invade private property, and not all of them acted like gentlemen.

Reports on the bad manners of hunters could be multiplied all over the nation. In some states it's so bad that hunting will close up tight unless immediate steps are taken to remedy farmer-hunter relationships.

What can be done to solve this problem? Can the hunter and the farmer patch up their feud so that one has sport and the other protection? In most states, by law, the game belongs to the public and not to the farmer. But the game ranges on private property. Right there we have a conflict of ownership—the farmer says even if he doesn't own the game he feeds it and provides a home for it. Anyway, he can't trust hunters and he has his own property to protect.

Every man should have the right to enjoy the primitive sport of hunting. Government recognized that right long ago when it reserved the ownership of game and tagged it public domain. But the right of a man to enjoy the sport of taking game has always conflicted with the rights of a landowner to exclude trespassers if he so wished. And there are more twists in the laws of trespass than there are in a can of worms. One law says the game belongs to the state and anyone can hunt, provided of course, he conforms to the restrictions of season and bag limit. But another law says a trespasser is violating the law. The farmer is in the middle; when he invokes the trespass law the trespasser counters with conflicting hunting laws. If a farmer says "no!" to a hunter, then the hunter is denied the right to take what belongs to him by law.

"I wouldn't mind letting people hunt if I could depend on the game warden to catch the vandals and the hunters who violate the laws," says an Ohio farmer. "But the wardens around here are either too lazy or too few to help. Try and find one of them when you want him! On the first day of the open season they are out hunting themselves and a hunter can kill all your stock and you, too, without any interference from the warden."

Most farmers are skeptical about how useful a "No Hunting" sign can be. Fred Hoover, of Harrodsburg, Kentucky, has a big farm, most of it in woods and pastures. Fred has "No Hunting" signs plentifully sprinkled along several miles of line fence. He can't patrol the line during the hunting season and if a hunter sees no one about he'll just as likely use the "No Hunting" sign as a booster to climb the fence as he is to observe it. Fred says that almost every sign is full of birdshot, parting gestures of cynical hunters. "I'm only an hour's drive from Lexington," he says, "and when quail season opens it looks like

Patton's drive to the Rhine—cars bumper to bumper with guns sticking out the windows. I'm busy picking corn and couldn't keep them off my place even if I had time. I call the sheriff and he says, 'That's the game warden's business.' I call the game warden and his wife tells me he's gone hunting, and would I leave a message. I give up."

"Another thing," he continued, "squirrel hunting is worse. The boys get up there in those woods with high-powered rifles and it's worth your life to walk outside. I tell my family to keep indoors. They tell me that Kentucky, like most states, has laws against hunting with rifles close to a dwelling, but it's never enforced. I could have my farm posted as a State game refuge: hunters have more respect for a refuge sign. But that's all snarled up with red tape."

"If you ask me how to solve the hunter-farmer problem I'd say to make hunting a crime."

Farmer groups have stated that game commission people have spent too much time on restocking, game propagation, and surveys, and not enough on how to better hunter-farmer relationships. Few of them have had any training in this angle of wildlife management and few of them are alive to its importance. Organizations such as the Wildlife Management Institute, Ducks Unlimited, and others, expend most of their energies on broad national problems of food supply for game, game laws, game preservation, and how to protect the sportsman, to the neglect of the biggest problem—how to protect the landowner.

While some farmers themselves like to hunt, they still do not relish the idea of uncontrolled hunting. Some never hunt, mainly because they have little time. Between eighty-five and ninety per cent of the small game hunters in the United States live in cities and towns and few of them own hunting land of their own. Not over half of them own their own homes. A non-homeowner naturally does not respect property rights as a homeowner does. One Tennessee farmer went on record as saying that, out of forty town and city hunters that he granted permission to hunt over his 300 acres during the 1950-51 season, only four respected his rights as they should have and were supposed to.

This man's neighbors had similar tales of woe. One of them caught a hunter on the opening day of the quail season with two bag limits of bobwhites, which included the last bird from one covey. The hunter had his wife along with him: she had a license, but she did not fire a shot. Another gave a city hunter permission to hunt on opening day. He shot the bag limit and then must have gone home and reported to his entire neighborhood. The next day no less than ten cars of hunters asked for hunting permission on the farm.

In New Mexico, where horses are used in hunting the larger game, the ranchers are refusing permission because of the indiscriminate cutting of wire fences. There have been a number of reports of rustling by hunters.

A farmer in Pennsylvania had a fine Jersey heifer shot by deer shiners. A Michigan farmer lost most of his little flock of turkeys. A careless hunter in Oklahoma thoughtlessly tossed away a lighted cigarette and started a fire that temporarily ruined several hundred acres of good cattle range. A gang of city dove hunters trampled down and practically ruined a five-acre millet field for a Georgia farmer. Flagrant vandalism was reported on over two-thirds of the farms on which hunting was permitted in Kansas during the 1951 pheasant season.

This dark picture, however, has a few bright spots. Alabama probably has less farmer-hunter trouble than any other state. In Alabama hunters' clubs lease hunting rights on a group of adjoining farms, agree to abide by the state's game laws and practice good sportmanship, or else run the risk of having the leases terminated. In turn the farmers agree to increase small-game populations on their farms. An owner of a 500-acre farm reports that, under the lease system, hunter troubles have been reduced to practically nothing on his place within a period of three years, and that he has been able to increase the bobwhite, cottontail, and squirrel populations over fifty per cent on his acres during the same period of time. "I always did like to see game on my place," said this farmer, "and now that the hunters are cooperating and I am getting a little something out of my efforts, I have far more heart to try to improve hunting conditions."

There's still a lot of Alabama farms not under the lease system, but a good share of them are posted, with the owners standing by for a lease proposition from a sportsman's club. Alabama's Game Department is sold on the idea for their state, and are cooperating with the farmers and hunters in every way possible. This includes free distribution of wildlife food, seeds and plants for cover, planning and management of refuge areas, and patrol of all leased areas by game wardens.

Arkansas has come up with a rather original system that so far has gone very well. The plan was originally worked out between Arkansas farmers and hunters, who prodded the State Game Department into cooperating with them. Sportsmen's clubs in almost every county in the state furnish prizes for the farmers and farm boys and girls making the best showing in the small-game-food and cover-restoration program, and the State Game De-

TENNESSEE farmers are interested in keeping their wildlife alive during the bad spells of winter weather. This tree feeder is a familiar sight.

THIS KIND of fence along a lespedeza field encourages small game. Outside the pasture is sericea, with multiflora rose blending into the woods.

ILLINOIS has set up public hunting grounds, with control maintained by issuing permits. This is the Iroquois Grounds near Kankakee, Illinois.

THE COTTONTAIL rabbit is hunted in almost every section of the country. He seems to thrive on adversity and considers the farmer's garden planted especially for his use. Quail are songbirds in some states and gamebirds in others. His cheerful "bobwhite" and appetite for harmful bugs have put the farmer on his side.

partment furnishes free of charge the necessary seed and plants for all participants in the program. The State Game Department maintains refuges where no hunting is allowed, and from these areas wild game is trapped and transplanted in those parts of the state where it is needed. This wild trapping and transplanting system has been found far more successful than any artificial propagation system yet tried.

Not too many years ago Iowa hunters had all but hung up their guns. The state's small-game supply had dwindled almost to zero, and hunting seasons on quail and pheasants were closed in most counties of the state. Small-game habitat had almost disappeared, for most Iowa farmers were disgusted with trying to supply game for an ever increasing horde of unruly hunters.

During the early thirties, following an alarming drop in crop and pasture yields of the state, farmers and land-use specialists made the first moves in a long-term conservation plan, involving not only the land, but all natural resources, which of course included wildlife. By a near-miracle politics were kicked out of conservation, and the wheels started rolling fast in the right direction.

Farms were contoured and terraced, hedges and fence rows were allowed to grow up, ponds were dug, and wildlife food was planted in unused nooks and corners. Game increased so rapidly that the long-closed quail season was reopened in several counties, the pheasant season was lengthened, and hunting in general took an upswing.

Along with this, however, upon demand of Iowa farmers, a system of cooperative hunting areas was organized. Each area, ranging from several hundred to several thousand acres, is open to hunting by permission only. A licensed hunter applies for and receives a permit for a certain kind of hunting in a cooperative area, but he must in addition ask each individual farmer for permission to hunt on his land. If the farmer feels that the game supply on his place is sufficient to stand further hunting, he may grant permission. The farmer then gives the hunter a guest card which permits him to hunt on that one farm only. The farmer holds the hunter's area permit while the hunter is on his place. At the end of the day's hunting the farmer checks the hunter's bag of game and if everything is in order gives him back his permit and takes up the guest card. Some cooperative areas use arm bands instead of guest cards. At no time,

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By Charles R. Koch

THE POLYELECTROLYTES

Since the announcement of Krilium last winter soil conditioners have multiplied like rabbits. Here's how they work.

Along with Nero and Mrs. O'Leary's cow, Charles Allen Thomas seems destined to go down in history as a fellow who started quite a fire. In the world of agriculture he is now known as the man who gave the vocabulary a new word—Krilium—and a new way to make loamy soil.

Thomas is president of Monsanto Chemical Company, which in the waning days of 1951 electrified the staid discussions of the annual meeting of the American Association for the Advancement of Science with the announcement that it had developed a substance which over-night could turn a hardpan into a beautiful loamy soil. It was said that Thomas was one day observing the progress of his crops on a well-fertilized piece of Ohio land when, like any farmer, he was puzzled by the striking contrast between neighboring rows. Since fertility definitely wasn't the cause of the phenomena—the rows were within a few feet of each other—what was?

THE POWDER FORM of soil conditioners (above) look and handle like flour. For farm use they will have to be spread sparingly with special equipment.

His instinctive reaction as a research chemist was to probe this question, to find out what was causing the difference. The answer proved to be a difference in soil structure between the rows and the solution that Monsanto came up with to improve the poor soil structure was Krilium.

Actually, modern scientific developments are somewhat slower and less colorful than this. Krilium and its kindred conditioners are an excellent example of the painstaking effort and the teamwork that go into scientific research.

Long before the beginning of World War II, soil scientists had been impressed with the apparent relationship between soil structure and productivity. Dr. J. H. Quastel, Professor of Biochemistry at McGill University in Montreal, had worked along these lines. He was convinced that the application of the right sort of chemical to a poor soil would improve its structure and productivity. While working for the Agricultural Research Council in England during the war he had proven that this was the case. The problem was to find a cheap chemical that would not poison the soil or the plant.

The Ohio Experiment Station had long been familiar with the problem of the old lake bed soils in northwest Ohio: soils that were once the most productive in the corn belt but which under continual cultivation were becoming steadily heavier and declining in tilth and nitrogen content. Experiments with these soils showed a definite relationship between structure and productivity and pointed up the importance of the proper cropping system in controlling the type and stability of the soil structure.

Becoming seriously interested in the problem, Monsanto invited Dr. Quastel to become adviser to an ambitious agricultural project, set its research men to work using the data already at hand, and

the compounds produced experimentally were sent to the various experiment stations and individual cooperators who tested them under both labroatory and field conditions. Finally, after several years of intensive effort, the secret could be kept no longer and in December, 1951, the world of agriculture and science was treated to the news of the development of the artificial soil conditioner.

If You Want to Get Technical

For the information of those who want to go into the technical side of this material, here is some chemical background. Monsanto uses as the base of its product a compound known cryptically as CRD-186. This, they say, is a modified vinyl acetate maleic acid compound. Other processors are using a hydrolyzed polyacrylonitrile. Acrylonitrile is a polymer that has been produced for a number of years by the American Cyanamid Company. It is used in the processing of such synthetic fibers as Dynel and Orlon, fibers that find their way into bathing suits, dresses, shirts and all sorts of dry goods, and it is also the base of a material known by the trade name of Aeropan which is used as a mud conditioning compound in oil well drilling. American Cyanamid's soil conditioner, Aerotil, is made from acrylonitrile as are also a number of others now on the market.

What the conditioners do and how they work is more important to the farmer, though, than their chemical formulae.

Possibly the first thing that must be made clear is that the polymers are not fertilizers. They add nothing whatsoever to the soil in the way of plant nutrients. Their one function is to improve soil structure; or more correctly, they stabilize soil structure after it has been improved by tillage methods of physically creating structure. They are powerless in themselves to create structure. Furthermore, they are of value mainly on silty or clayey soils. In sandy soils, or soils with a great deal of newly incorporated organic matter they are of little use. It seems that their effectiveness is somewhat limited even in some types of clay soils, though at present not much is known about this.

To understand how they work and what they do requires a little refresher in soil physics. Even soil, as we know, has a certain texture. That is, the mineral particles in the soil can be classified according to their size as sand, silt or clay. The sand is coarse; the silt particles are considerably smaller than the grains of sand; and the clay particles are of microscopic size.

Then, besides texture, most soils have what is referred to as structure. Structure pertains to the manner in which these individual grains of soil material are arranged within the soil mass. Most commonly, they are grouped into what are called aggregates of different sizes and shapes, and in soils of good tilth these aggregates usually vary from pinhead to pea-size. Texture and fertility, of course, are of prime importance in their influence on productivity. But the productivity of even a very fertile soil will be decidedly limited unless its aggregates are of the proper size and of stable character.

Soils that have what the agronomists call a granular or crumb structure are most favorable to the growth of plants. In nature this structure is brought about by the action of soil bacteria which work in and upon the organic matter in the soil

The soil in the pot to the right of each of these pairs has been treated with one of the new soil conditioners; the other has not. Note how the treated soil absorbs rainfall, remains loose and crumbly, while the untreated soil becomes baked and hard. Above, the difference in surface structure between the treated and untreated soil is apparent.

producing a gum referred to as a polyuronide which serves to bind the soil particles into aggregates. These polyuronides, however, are themselves subject to bacterial deterioration causing the aggregates to be of unstable character. Moreover, there is something of a vicious circle here in that bacteria cannot function well in a soil of poor, tight structure due to a lack of aeration, so that a soil that most needs this treatment is least likely to receive it. "Them as has gits," is as true underground as above.

Krilium and the other soil conditioners function as artificial polyuronides to improve the structure of heavy clay soils—soils that are sticky and unmangeable when wet and which dry out into hard unworkable clods.

The tightness and clods of clay soils are caused by a property known as plasticity. That is the quality that makes it possible to mold wet soil in various forms—to make mud pies. It is a property that is peculiar only to clay soils. The water breaks down the aggregates leaving the soil with a single grain structure that is almost impervious to tillage. The problem with this type of soil has always been to break up this single grain structure and to increase the aggregates. In so doing plasticity is not only reduced but drainage is promoted and tilth improved.

Another very important condition that is brought about by the proper management of clay soils is the improvement of water-air relationships, that is an increase in porosity. Porosity is a term used by soil scientists to describe the percentage of the total volume of the soil mass occupied by the pores of the soil. The ability of the soil to hold water as well as the volume of its air space depends upon the shape and size of these pores together with the total surface area of the soil grains. And here is the way this works.

There are three forces that cause the movement of water through the soil—gravity, heat and capillary tension. Heat vaporizes the water and allows it to move through the soil air; gravity pulls it downward and capillary tension draws it upward or across in the manner that a lamp wick takes up oil or a blotter takes ink. If the pore cavities are large, capillary tension will be reduced or entirely inactive, gravity will quickly draw the water to lower levels; if they are small, the capillary action will be the dominant one in the soil.

Usually, sandy soils have much larger air volumes than the heavier-textured soils because they have larger pores from which gravity removes the water. Clays and clay loams have very fine pores that maintain maximum capillary tension and thus their water volume is high and their air supply low; so low, in fact, that the supply of oxygen is insufficient for the needs of plant roots and for the action of aerobic bacteria. The development of granular structure greatly increases the air volume in these soils. That's where our conditioners come in.

Ordinarily, granulation is a condition that is achieved only by a long and difficult process. Until now it has been induced by the introduction of organic matter into the soil, by plowing down manure, cover crops, peat moss or compost. Nature, as we have seen, accomplishes the task with the polyuronides produced by the bacteria.

The new synthetic soil conditioners work on a principle of magnetic attraction. They are what the scientists call polyelectrolytes. When they are dissolved in water their ions develop charges that are attracted by the clay particles to form the desired aggregates. The stabilization of the aggregates is accomplished almost immediately. So far as is now known these aggregates have a relatively permanent stability if undisturbed, but, of course, are broken down slowly by plowing and cultivating. They are not readily subject to bacterial deterioration. Test plots at Ohio State University that are now in their third year still show good aggregation. As a matter of fact, the freezing and thawing of winter seems to aid the work of the conditioner.

Because of their newness and, up to now, their prohibitive cost, farmers have as yet had no opportunity to try these conditioners on their fields. But results coming out of the experiment stations are extremely heartening. Heartening, that is, with one qualification. Dr. W. P. Martin, Professor of Soil Science in Agronomy at Ohio State University, who has played midwife and nurse to this project almost from its inception, speaking for his colleagues, Drs. Volk and Taylor, says that "We have reached the point where a period of disillusionment will set in. The public has been told of the wonders of these conditioners. The material is being placed in their hands. But it must be used very carefully and with strict attention to instructions. If not—and there will be many cases in which instructions will be disregarded—the results will be disappointing to say the least.

"A conditioner does not create miracles. The gardener or farmer may not note any ease of tillage right away. The stuff must be worked into the soil. Remember these conditioners do not create soil structure. They simply stabilize or preserve a good structure once it has been established"

There are now almost three dozen soil conditioners of the polyelectrolyte type on the market. Some are powders, some are in flake form, some are liquid. Krilium, the one that was the subject of the original announcement last winter, is a powder. To apply it, the ground should first be plowed and worked with a disc or rototiller; then the powder is spread over the ground and worked in with another discing or rototilling. And though it has already been repeated, it won't hurt a bit to again emphasize the fact that thorough working and conditioning of the soil is the secret to good performance from Krilium.

Another important point in application is that the powder must be absolutely dry. If it becomes wet during the process it forms a gelatinous mass with which it is impossible to achieve good incorporation. Once it is worked in, the powder is dissolved by the moisture in the soil and the improvement in aggregation and structure is immediate. Krilium can apparently be applied as successfully at one season as another. It would seem though that the logical time would be at the time of seed bed preparation so as to stabilize the favorable seed bed condition.

As to the relative merits of the powder or liquid form, Dr. Firman E. Bear, chairman of the Soils Department, Rutgers University, and one of the top agronomists of the country, says "It is our opinion from studying these materials that the liquid forms cannot be expected to be very effective as soil conditioning agents. The best results are obtained from the use of dry powders, thoroughly mixed with a relatively dry soil."

At this point the all important question is how much does it take and what does it cost? That is a question that unfortunately just can't be answered very easily right now. The Monsanto people are saying that to do the best job of structure building Krilium should be worked into the top three to six inches of soil and five pounds of the material will treat 40 to 80 square feet within that depth range. Five pounds of the Merloam formulation of Krilium (Merloam formulation merely refers to the dilutant or carrier of the Krilium) has a price tag of $6.95. That means it would cost a farmer somewhere between $3500 to $7000 to give an acre this optimum shot.

But hold on! The point is that in field work it probably is not necessary that the entire area be treated. Experiments are now going forward testing the practicality of applying the conditioner in the seed band so that only the soil in the immediate vicinity of the plants to be benefitted is treated. For the prevention of crusting to improve germination or for erosion control it has been found that as little as one-half pound per 100 square feet (200 pounds per acre) has been effective. That, of course, is still $278

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IN TREATED SOIL (left) the bean sprout emerges with ease. In untreated soil (below) is almost breaks its neck trying to force its way through the concrete-like crust.

SOIL CONDITIONER, seed and fertilizer in a solution are being applied in one operation by this truck. Built by the Monsanto Chemical Company, the equipment is used for erosion control treatment of levees and highway shoulders and banks. A thorough discing (left) puts a seed bed in shape for applying a soil conditioner.

WET NURSING PIGS

By Grant Cannon

Synthetic sow's milk makes three litters a year a possibility. Taken from the sow, the pigs grow faster and more are saved.

HOG FARMERS have a new feed for young pigs, a synthetic sow's milk made of powdered milk, fats, vitamins, and antibiotics which comes to them in semi-solid or powder form. They use this sow's milk substitute to make sows produce three litters a year instead of two; to reduce death losses from mashing and disease; and to turn the runt into an oddity instead of a standard member of almost every litter.

Two main methods have been developed for using these new sow's milk replacements. The first and most spectacular, consists of taking all of the pigs from all of the sows after the second day and putting them on synthetic milk for four to six weeks while they are getting used to solid feed. The other method throws a hard look at the cost of these substitutes and at the additional labor of dishing them out and uses the milk substitutes as a supplementary feed for special cases and as a buffer feed at weaning time rather than as a daily menu for all pigs.

Except when the milk is used as a buffer at weaning time, the new synthetic is fed in much the same manner to pigs on the all-out method or the special case method of feeding. The pigs are left with the sow for the first two days to get colostrum (none of the artificial milks on the market have been able to duplicate colostrum) and then taken from her and put on artificial milk. The sow is bred again as soon as she comes in heat. Healthy, same-sized pigs are penned together and fed the sow's milk replacement for four to six weeks. A good creep feed is kept in front of them in a self feeder after the first week.

Most farmers feed from three to four pounds of the dry milk powder per pig each week they are on the milk. This adds up to from 12 to 20 pounds of the stuff depending on how long it is fed. The milk powder runs from 26 to 40 cents a pound depending on the brand and the quantity bought or about $1.20 per week per pig. To get his money back, the farmer must raise more pigs per litter and get more litters per sow.

Since most hog farmers would try out this new milk for special cases rather than jump into a whole new feeding program, Frank Sollars' experiences are of special interest. Sollars, a big, 190-pound man farms his 550 acres in Fayette County, Ohio, turning out 700 hogs a year. In his home county where some of the big, sleek Hereford farms gross over $50,000 a year, Sollars is one of the community leaders.

"About feeding a substitute for sow's milk," he said, "you've heard about the pecking order in chickens? I've noticed a shoving order in pigs which is about the same thing. The big pigs shove the small pigs and the small pigs shove the runts right down to the hind teats. The sow's hind teats give less milk than the front. If I can't step-mother these runts on a sow with a few extra teats, I put them on the artificial milk. I also sort out any natural weaklings from the litters and put them onto the artificial milk in pens with pigs their own size.

"Sometimes a whole litter of pigs does poorly. There's another time I use artificial sow's milk. I pull them all off the sow and start feeding them. The antibiotics in the milk usually help. If I wait to find out what's wrong, they might all be dead.

"And there's another way to use this new milk. If you have a sow that's lost half her litter, it isn't worth the money to give her full feed so she can nurse four pigs. Those pigs go on artificial sow's milk.

"I tried using artificial milk on all pigs in order to get three litters a year instead of two from my sows. But I gave it up. We just didn't have any luck breeding the sows this way. We had the vet give them shots with Upjohn's ECP to bring them into heat, but sometimes it took three weeks and three shots before we got the sow with pigs. You just can't cross up nature that easy. And I'm not positive three litters a year makes for healthy pigs; it sure turns a sow into an old lady before her time.

"That's half the reason we don't use artificial sow's milk on all of our pigs. The other part is the extra labor I have to hire to feed this milk compared to using less labor and buying less feed when the pigs are on the sow. While I can't see using artificial sow's milk for all pigs, I use it regularly for special cases. They tell me I buy more of the stuff than any other hog farmer in Ohio.

"You don't need special equipment to feed artificial sow's milk, but you must have hot water. You should feed it to them at around 85 degrees for the first week and you never want it as cold as our water usually is. I use a kitchen electric mixer to stir the powder into the water.

"I keep my pigs in pens that are six by six feet. The pen is partitioned into sections which are roughly one-third and two-thirds of the pen. The pigs live in the bigger area under a brooder light most of the time. I feed them their milk three times a day in the small section which has a cement floor with no litter. That way I can keep their pen and the pan they drink from cleaner."

Opposite: The pigs scamper over the wire floor of a brooder and drink artificial sow's milk for the first two weeks of life, then they are transferred to pens and drink the milk out of a fountain.

The All-Out Method

Four hundred miles to the west is a farm which uses more of the new milk substitute than any other farm in the United States. On the day they began feeding the milk to all of their litters, February 10, 1952, the central farrowing house at the Little Sister Farms in central Illinois was a madhouse. This was the day on which continuous farrowing began and the new-fangled pig brooders were tied up in some freight yard far away.

Pigs weighing 30 to 40 pounds are ready for the feed lot at seven weeks old. They are kept on creep feed for a week or two more while they get used to the new home.

Continuous farrowing consists of breeding so that one or more sows farrow each day of the year. The Little Sister Farms, which are owned by William Cooke and, incidentally, are named after a stream, not a religious order, are using continuous farrowing in their pig hatchery on the home farm to supply the rest of their farms and other farmers in the area with feeder pigs. But continuous farrowing depends on putting the pigs on artificial sow's milk so that the sow can be bred again immediately. Until this windy day in February, the men at Little Sister Farms had thought that feeding the recently developed synthetic milk depended on using pig brooders.

"We could have left the pigs with the sows, of course, but that would have meant delaying our whole continuous farrowing program because we couldn't rebreed the sows right away. So we decided to rig up our own feeding system," Fran Platt, mana-

Clean, dry pens, warm and draft free are a must for orphaned pigs.

Steam cleaning equipment helps keep down bacteria which love the milk, too.

An old washing machine whips the powder and water into palatable milk.

ger of 28 farms, said. He chuckled as he recalled the hectic day. "First we got two-by-fours, drilled holes in them big enough to hold a nursing bottle, put in a row of baby bottles filled with artificial sow's milk and set up a battery of these in individual pens. Most of the pigs ignored them completely. We got one little pig to take a chance on a bottle just as one of the older farm hands come through the building. He stood there laughing at us, and said, 'That's the first time I've ever seen a pig sucking off a two-by-four.' But we couldn't get the rest of them to take to our two-by-four mother.

"We then tried putting the milk in pie pans, setting these on boards to keep them up out of the litter," he continued. "We dipped the pigs' snouts in the pans, but they didn't take to this method either. We worked from early morning to exhaustion, and were sitting around mighty disgusted; pie pans were on the platforms, nursing bottles in the racks, bottles and pans of milk were sitting around on the floor, when the pigs, themselves, solved the problem. They walked over to the pans on the floor and started to drink. Those on platforms were simply too high for them. Since then we've forgotten all about trying to make pigs take to the new milk. Our brooders arrived and we've put through hundreds of litters without ever teaching a pig how to drink."

What is Sow's Milk?

The composition of sow's milk has been known for some time; 81.19 percent of it is water and the rest, solids. The solids are made up of 5.91 percent fat, 6.11 percent protein, 5.84 percent lactose and 0.95 percent ash. Sow's milk is a good deal more concentrated than cow's milk. The experimentors found that there was nothing sacred or secret in the sow's formula. As a matter of fact, it now appears that the sow wasn't even producing the best nursing formula for her baby pigs. Pigs could, and have been, successfully raised on skim milk from cows. And they have been raised on many formulae worked out by the curious scientists.

It was found that total solids could be reduced to as little as 12 percent of the formula before its nutritional value was weakened, that the protein content could be increased and that lard or corn oil would serve very well as the source of fat. Dried skim milk, for example, could be used if it were supplemented with minerals, including copper and iron, fat, and the fat soluble vitamins, A, D, E and K. One vitally important factor in feeding the synthetic milk is that we are now able to get the growth stimulating antibiotics to the pig within the first few days of life. All feeding tests have shown that antibiotics are more effective during the first six weeks than in older pigs.

As yet, no one has come out with a formula which will take the place of colostrum—and there is one of the hitches in the program. The first two days of life are the most dangerous for the pig with the sow—but they must be kept with the sow to suck colostrum.

How to Feed Artificial Milk

The many systems tried by Frank Platt and his associates at the Little Sister Farms on February 10th had been tried experimentally elsewhere. When the pig brooders arrived, Platt settled down to a

"This is what our pigs looked like before we started feeding them antibiotics," one of the men said jokingly, holding up a mouse he caught nibbling at the milk powder.

Sow-nursed pigs relish the artificial milk when fed as a buffer at weaning.

feeding plan that had been worked out by the scientists at the Charles Pfizer Company. His brooder is a wire floored cage with its own heating element and feeding trough. It is a heavy wire adaptation of a cage-type turkey brooder. Beneath the wire mesh floor is a sheet-steel tray to catch the droppings from the ten pigs which occupy the brooder. Along the front is a metal feed trough, one end of which is separated for water which is fed to it from a gallon jug. The other end is separated for dry feed. The large center section is for the sow's milk replacement. Brooders can be stacked three high to save space.

Baby pigs are put into the brooder at two days old, and are kept there for the next two weeks. Continuous feeding of milk replacement for the first week and three-times-a-day feeding the second keeps Robert Haggerty, who is in charge of the pig hatchery, and his two assistants on the run. At the end of the first week, the pigs are offered their first dry ration. They are placed in a glazed brick farrowing pen, twenty to a pen, 16 days after they are farrowed. Here they continue to get the artificial sow's milk from five-gallon fountains. During the first week out of the brooder, their third week of life, they continue to get milk three times a day. In their fourth week, the amount of milk they are given is reduced so they turn more and more to dry ration. "They don't give up the palatable warm milk without a struggle, however," said Robert Haggerty. "When feeding time comes, the pigs line up around the fountain like spokes from the hub of a wheel. They brace their back legs and push with all their might to keep their snout in the narrow trough."

At the end of four weeks, when they are taken off milk, these fast-growing pigs weigh around twenty pounds. "Our hope is to get them off the milk, onto the cheaper dry feed as fast as we can," Haggerty said. "There are a number of good creep feeds on the market. We have our own mix, and I think it's a honey."

The ration used at the Little Sister Farms is:

Oatmeal	900 pounds
Ground Corn	300 pounds
Meat Scraps	180 pounds

Tiers of brooders can be stacked in a small space. Each wire brooder has its own heater and water jug. Stalls keep the pigs from splashing milk on each other.

Alfalfa Meal	100 pounds
Soybean Oil Meal	60 pounds
Dried Yeast	60 pounds
Dried Skim Milk	110 pounds
Fish Solubles	70 pounds
Dried Whey	80 pounds
Fish Meal	35 pounds
Steam Bone Meal	5 pounds
Salt	7 pounds
Molasses	70 pounds
Bi-Con TM 5	5 pounds

(This is an antibiotic feed supplement containing a guaranteed equivalent of 5.0 grams of crystalline Terramycin Hydrochloride per pound).

Bi-Con 6 Plus	3 pounds

(This is a Vitamin B^{12} feed supplement containing a guarantee of 6.0 milligrams of Vitamin B^{12} activity per pound).

Vitamin and Mineral Supplement	5 pounds

(The vitamin and mineral supplement contains Riboflavin at 200 miligrams per pound, Pantothenic Acid at 300 milligrams per pound, Niacin at 600 milligrams per pound, Choline at 6,000 milligrams per pound, plus trace quantities of Cobalt, Chloride, Zinc Sulfate, Manganese Sulfate; and including sufficient Vitamin A to give 2500 IU Vitamin A per pound finished feed and sufficient Vitamin D to give 500 IU Vitamin D per pound finished feed).

Other feeders of synthetic milk prefer to keep the pigs drinking their formula for six to eight weeks. These feeders delay introducing the pig to dry feed until its second or third week of life. Followers of this system will use two to ten pounds per pig more milk product in raising them. "I'd rather not be stingy with the milk," one farmer said. "When I started feeding artificial sow's milk it was with five litters of pigs, all of which were scouring. As

(*Continued on page* 72)

A SEEDBED FOR PASTURES

Preparing the right kind of seedbed is the first step in starting any grass or legume.

THE term "seedbed" is a misnomer if you think of a bed as a place to sleep. So far as a seed is concerned, it does all its sleeping before it hits its bed of soil. A seedbed is not a place of rest, but an athletic field where seeds engage in a winner-take-all, life and death struggle with the elements, insects, disease, and competitive plants. A seedbed must be prepared in such manner as to tip the odds in favor of the principal contender, the desired crop, and against the opposition, weeds, insects, disease, and adverse weather.

Farmers and agronomists who have spent their lives trying to take the gamble out of seeding are quite willing to agree with Earl Jones, extension agronomist, Ohio State University, who frankly confesses that "Seedbed preparation is something that still needs a lot of research. There's too much we don't know about it."

Nevertheless, we have come a long way in the last twenty years. Let's pause and tally up what we have learned. Because of the extensiveness of the subject and the ever increasing interest in grassland farming in the middle United States, our discussion will be limited to the preparation of seedbeds for grassland farming: to the problem of getting grasses and legumes off to a better start in life. After all, one of the most serious objections to going to grass is the difficulty of getting good stands, or in some cases, of getting any kind of a stand at all of pasture and meadow crops.

The experts have been just about as unanimous as experts can be in agreeing that the small-seeded legumes and grasses require a seedbed of higher quality than any other crop. Furthermore, their first requirement for a well-prepared bed is firmness, and they all condemn deep seeding as fatal to a good stand. From this point on practices quite naturally differ, as might be expected with the variations in soils and climate, the previous use and condition of the land to be seeded, and the equipment available for doing the job.

Obviously, if you are going to attempt to put a large piece of your place into meadow or pasture, you'd better make a careful analysis of your resources and get some special local advice for a successful operation. This article makes no pretense of solving your individual problems in getting a good stand of forage, but it offers something of a summary of the experience of men who have learned to do the job in satisfactory fashion themselves.

In Iowa, they grow tall corn; and of late they have been gaining an equally envious reputation for their meadows. One Iowa farm management company attaches so much importance to the ability of a farmer to get a good stand of grasses and legumes that it incorporates in its leases a clause making it an absolute condition of tenure that the tenant get a good stand of grass in one year, regardless of weather, pests or other acts of God. If the stand fails, the tenant moves.

So how can he guarantee those stands? Like every other operation dependent on nature there are no guarantees. Iowa farmers just do everything in their power to turn the odds in their favor. Like the philosopher who observed that the way to reform a man is to start with his grandparents, they have concluded, as have most other farmers the country over, that the way to grow good forage crops is to start

THE BUSH AND BOG HARROW chops up trees and brush to start a mulched seedbed.

A STALK CUTTER shreds weeds, stubble and corn stalks. A good discing should follow.

with the land. This is point one—find out what is the matter with the soil and how to correct it. This demands a complete soil analysis to indicate the requirements for lime, nitrogen, phosphorous, potash and possibly some trace minerals, too.

Step two is the actual seedbed preparation. To make the job a little tough, let's assume the seeding is to follow corn. The corn was on too long to permit any work on the field in the fall so it becomes a spring-time operation. Our Iowa expert sees little need for plowing, under such circumstances. As a matter of fact, since his intention is to sow oats as a companion to his meadow mixture, waiting for the ground to dry out enough to plow might delay seeding to the point where it would seriously reduce his oats yield. So a thorough disking of the stubble field is the prescribed treatment followed by a dragging. The dragging is to break up remaining clods and to firm the bed. Then, he prefers to do his seeding in two operations, using a drill to get his oats in and broadcasting the smaller seeds. The grain he places two to three inches deep while the meadow mixture is sown only a quarter to a half-inch deep. This shallow covering is accomplished with a spike-tooth harrow.

Basically, those are the steps every farmer follows in preparing his seedbeds. He may have other equipment available or may vary his operations somewhat, but fundamentally the steps consist of turning or stirring the soil, firming the bed, and sowing the seed. Now let's examine in more detail each of these operations in this particular instance and the reason it was done in this manner.

Again, the importance of a preliminary soil analysis and the application of the deficient materials must be emphasized. Then, going on to the ground breaking, the question arises, "Why no plowing?" As indicated above, waiting for the ground to dry enough to do a good job of plowing might seriously handicap the oats yield by delaying sowing. Then, too, experience as well as experiments indicate that the added expense and labor of plowing offers little advantage under the circumstances. Experiments in Ohio, Pennsylvania and South Dakota, have shown that if a farmer feels he must start his seedbed off with the plow, deep plowing is of no advantage whatsoever.

The use of a stalk cutter before breaking the ground might be helpful under some circumstances in stimulating a more rapid return of organic matter to the soil.

Whether the land is plowed and disced or just disced, the job must be a thorough one. Miraculous as is the life stored in a seed, it still must have a bed it can easily penetrate both upward and downward; and its bed must be free from air pockets. For this reason, firming is also necessary in preparing the bed. A drag will do if nothing more suitable is available. A cultipacker is especially valuable, particularly for late summer seedings. Sometimes the wet condition of the field prevents its use in the spring. You've noticed how your footprint draws moisture in a finely harrowed soil. That's the same thing that happens in a well-compacted seedbed. The capillary attraction is increased, thus drawing vitally necessary moisture to the seeds. Furthermore, the firming produces a good bond between the soil and the seed, eliminates air pockets, and permits a uniform, shallow covering of the seed.

That shallow covering is of the utmost importance. Small seeds the size of the clovers and timothy just can't make it from depths more than an inch below the surface. Experiments have invariably shown that best stands are obtained with seedings no more than a quarter to a half-inch deep. Our Iowa farmer was so well aware of this that he took the trouble to sow his oats and his meadow mixture in two operations, knowing that the optimum depth for one was bad for the other.

In some sections with a very dry climate or sandy soils the seedings must be deep in order to reach moisture, but such practice is strictly an emergency measure.

A step our Hawkeye friend neglected, and one neglected by far too many, is mulching. A top dressing of manure or straw at the rate of about a ton to the acre or even more is well worth the added expense and labor. Mulching holds moisture in the surface and reduces soil temperatures, reduces the hazard of crust formation, and protects the germinating seeds from freezing injury in the early spring.

A good place to get a line on the best practices followed in Ohio and bordering

(*Continued on page* 106)

THE SEEDER-CULTIPACKER makes a firm bed as it seeds; reduces seed costs a third.

THE SOIL SURGEON—a recent development that does the work of harrow and drag.

BAND SEEDING ATTACHMENTS place the grass seed over a buried strip of fertilizer.

THE LAND LEVELER, first used on irrigated land, is now used to cure bad drainage.

A FIELD CULTIVATOR stirs the soil without turning it, is useful in renovating pastures.

A ROTARY TILLER makes a seedbed in one operation. It can handle trash, sod or weeds.

THE DOUBLE DISC is the prime implement in most methods of seedbed preparation.

ATROPHIC RHINITIS

By Jack Bailey, D.V.M.

DURING the last year or so we've been hearing quite a bit about a new swine disease that's called atrophic or dystrophic rhinitis. But it can't be called a new disease, for it was recognized as causing severe losses in some parts of Indiana as far back as 1944. We don't know whether it's getting worse or only being noticed a little oftener, but we do know that the disease has now been reported in most of the Corn Belt states and Canada, as well. A good many owners are beginning to get worried over the matter, and with good reason. It shapes up as being most serious for owners of pure-breds who sell quite a few of their animals as breeding stock. The disease can cause heavy losses for any farmer that's raising hogs.

STEAM is a fast and effective disinfectant to use on equipment after a rhinitis-affected animal has been removed from a herd. Opposite, a section cut through the nose of a pig suffering from the disease. The turbinates are filled up and the whole snout swollen. Any pig with cold symptoms is a suspect and should be isolated for thirty days.

The name describes its symptoms pretty well, for "rhinitis" means inflammation of the nostrils. Likewise, "atrophic" means shriveled or shrunken, and "dystrophic" means defective. The first sign of trouble is often a sniffling and sneezing of baby pigs like that caused by dust or a slight cold. Within a short time some of the animals will be noticed as shaking their heads, "watering" at the eyes, and discharging from the noses. Appetites fall off, and at times an occasional pig will be noticed rubbing its nose on anything handy or scratching it with a foot.

As the pigs grow older their noses become visibly affected. The skin in that region becomes tight and wrinkled, while rotting of the facial bones causes many of the snouts to assume a "caved-in" appearance or look like they're twisted off to one side. A few of the animals may suffer severe nose-bleed because of damage to the lining of the nostril. Few of the pigs die as a rule, but losses are high because of stunting and general failure to do well. A year or more is sometimes required to get animals ready for market. The appearance of infected animals usually spoils their sale for breeding stock.

The cause of atrophic rhinitis is unknown at this time, but it seems likely that it may be a combination of factors. Anyway, it's been suggested that the rhinitis is due to one thing while the stunting and destruction of facial bones may be due to different kinds of bacteria commonly called "secondary invaders." The theory is that rhinitis damages the nostril linings first and makes it possible for the germs to move in and set up infected areas. Whatever the exact cause, there is no doubt but what the disease is spread by so-called "carrier" animals which may appear perfectly healthy.

The outbreak in a Missouri Duroc herd was evidently touched off by one or both of two sows which were purchased two years earlier from farms in adjoining states. At any rate there had been no previous trouble with atrophic rhinitis, and no other animals had been imported for years. This seemed rather strange at first, for neither sow ever showed any signs of nose trouble, and both had perfectly normal litters the first year in their new home. However, it was pointed out that this outbreak followed the usual pattern, for rhinitis seldom is noticed until the second year after carriers are brought into a herd.

The Iowa breeder of Hampshires evidently started his trouble by purchasing a couple of boars, which indicates that carriers can be of either sex. The same holds true of barrows, too, for infection has often been traced back to feeders which were purchased at community sales or sales barns.

If an outbreak of atrophic rhinitis occurs on your farm, you probably won't recognize it right away, for it's just about impossible to diagnose the trouble when it first starts in baby pigs. Several of the animals may die early of pneumonia encouraged by the rhinitis. Under such conditions the disease may be confused with colds, erysipelas, nutritional deficiencies, "shaking pig" disease, and the common "bullnose." This last is an altogether different disease, for it isn't spread from one animal to another like the atrophic type of rhinitis. Furthermore, it is caused by filthy conditions and is seldom seen when pigs are kept fairly clean, while bad outbreaks of atrophic rhinitis have occurred when swine were kept under the best of sanitation programs.

Roughness, coughing, and failure to do well may be caused by worms. Regardless of what you're tempted to think, though, you should always suspect atrophic rhinitis when suspicious symptoms appear in pigs kept on farms where the disease has been known in other years. This is because it may persist indefinitely after premises are once infected.

The disease is much easier to recognize after pigs have reached the age of three or four months. By that time about a fourth of the animals will be permanently stunted and showing typical symptoms of nasal deformities. Half of the herd will probably look all right while failing to gain properly, while the other fourth can generally be figured on to show no ill-effects whatever.

If you make a definite diagnosis of atrophic rhinitis you're still going to be up

(Continued on page 134)

The best control of
this contagious disease
is to keep it off
your farm —
If you get it you're
out of business

Entering daily receipts and expenses keeping an inventory, and recording production records make for . . . . . Accurate

DAILY NOTES are kept of cash spent and received and entered in the account books once a week. Del Burger's son finds that arithmetic is useful after all.

THE PROBLEM of record keeping is one that is fresh in the mind of Harry Olson, a heavy-set Nebraska farmer, who said recently, "I heard of a farmer out west of here who had a fire in his barn. While the family and neighbors were trying to put it out, he grabbed an ax, rushed into the burning building, cut the door loose, and dragged it out to safety. When a friend asked him why he'd done it, he said, 'Why man, I've got all my farm records written on that door.'

"That story makes me a little uncomfortable," Olson said, taking off his hat to mop his forehead which was divided into pale hair-line and sunburned face.

"It comes too close to describing my own record keeping of a year or two ago to seem funuy to me—like having someone tell a mother-in-law story in front of your wife's family.

"I did a little better than barn door bookkeeping," he went on, wiping the sweat band of his hat, "but not too much better. I kept a record of sales of crops and pigs and I kept receipts for bills I'd paid and made notes of most of my small cash purchases, but I never broke them down to where they made sense and I could put them to use. My tendency was to estimate my income by the amount of money I had in the bank at any one time and to get my personal expense and the cost of running the farm all mixed up. To find out how the farm was doing I had to subtract the money I'd spent for a new washing machine I bought at the local store where I get my farm supplies, or the cost of my wife's new coat from the farm expenses. I never even tried to find out how a particular farm project was doing."

Most farmers can give a good account of their income from memory since it usually comes from a few rather large sales. But farm expense is a different matter, it is a day to day drain. Keeping track of expenses from memory is like trying to estimate the amount of water that has drained out of a leaky bucket by recalling the number of drops you've seen fall. Yet knowing the expenses is fully as important to the farmer in planning his work as knowing the income—at tax time the record of expenses is probably more important since it is the basis for most of the deductions. Unless both income and cost are known the farmer will have no way to figure his net. If we were all equipped with perfect memories, bookkeeping might become a lost art, but, as Confucius once said, "The palest ink is better than the best memory."

The irony of Olson's situation was that it would have taken very little extra effort to change the records he *was* keeping into a good, usable set of books as he learned later. All of the business records which he or any farmer wants to keep fall into three classes:

1. *An inventory or property list,* which describes all of the farm's property on a stated date. It shows the financial status of the farmer and his equity in the farm business. It is personal to the extent that it includes the farm liabilities or debts of the farmer as well as a list of the assets of the farm business. A comparison of two inventories, one taken at the beginning and one at the end of the year, will show the financial gain or loss for the year. The difference between successive inventories can be important in showing a trend in the affairs of the farm. A simple inventory would look something like this:

LIVESTOCK:		
10 Holstein cows @ 300.00	$3000.00	
7 Hereford cows @ 275.00	1925.00	
8 Holstein heifers @ 200.00	1600.00	
8 Holstein calves @ 75.00	600.00	
5 Hereford calves @ 75.00	375.00	
1 Hereford bull @ 600.00	600.00	
		$ 8,100.00
HOGS:		
21 sows @ 75.00	1575.00	
56 feeder pigs @ 27.00	1512.00	
1 boar @ 100.00	100.00	
		3,187.00
CHICKENS:		
235 hens @ 1.00	235.00	
15 cockerels @ 1.00	15.00	
		250.00
TOTAL LIVESTOCK		11,537.00
GRAIN AND HAY:		
1575 bu. corn @ 1.30	2047.50	
970 bu. oats @ 80c	776.00	
50 tons alfalfa hay @ 20.00	1000.00	
130 bales straw @ 30c	390.00	
		4,213.50
PURCHASED FEEDS AND SUPPLIES:		
250 lbs. soybean meal @ 5.50 per 100	13.75	
330 lbs. tankage @ 3.50 per 100	11.55	
3 tons 10-20-0 fertilizer @ 50.00	150.00	
		175.30
		$15,925.80

2. *Records of receipts and expenses,* including capital outlays, which show not only the amount of money involved, but what products were sold and what the expenses were. These records are closely related to the inventories; the true picture of the year's business is available only when both are worked together. Most farmers pay a good many of their bills in cash and don't bother to take receipts for the bill paid. Harry Olson made a practice of noting down each evening every penny he had spent during the day. Once or twice a week he'd enter these notes into his permanent records.

Farm Accounts

By Warren H. Dunn

Classification for accounts to be used in farm bookkeeping might run as follows:

ASSET ACCOUNTS:
Cash in bank
Petty cash (pocket change, etc.)
Accounts receivable
Notes receivable

LIABILITY ACCOUNTS:
Accounts payable
Notes payable
Mortgages payable

PROPRIETORSHIP ACCOUNTS:
Invested:
  Capital invested
Purchases:
  Livestock purchased
  Machinery and tools purchased
  Building materials for permanent improvements
  Modern improvements purchased

INCOME:
Crop sales
Livestock sales
Crop product sales
Livestock product sales
Miscellaneous sales
Incidental income

EXPENSES:
Labor
Purchased feed
Crop supplies
Maintenance of machinery and tools
Maintenance of buildings and other land improvements
Insurance and taxes
Interest
Incidentals

DEPRECIATION SCHEDULE

In setting up accounts most farmers will want to use those account headings established in the income tax schedule (form 1040 F) which apply to their farm.

3. *The production, performance, and incidental records* which explain the facts back of the sales of the finished product fit in with inventories and financial transactions and are necessary for working out the reasons for changes in yield per acre, production of milk per cow, gain of hogs per hundred pounds of feed, and other figures which farmers use when planning changes in the farm business.

Setting Up the Book

"The idea of doing bookkeeping had me buffaloed," Harry Olson said. "I just couldn't think of myself as an accountant. After I got into it I found that it was just the idea that had me scared. Actually, all bookkeeping amounted to was a little reasonably careful work about once a week. Keeping all bills and receipts and daily notes on cash outlay made it not much of a chore."

While farm bookkeeping is not a question of forms, but rather of what accounts to keep and how to keep them, convenient forms are time savers in the long run. Actually about the only thing needed is what we call a Day-Book form. This is used for the recording of cash items, and a book with this ruling can be bought almost anywhere. It consists of a page ruled with a number of double money columns, the left-hand one is used for

SPRAY MATERIAL AND LABOR are deductable expense items on either cash or accrual tax basis; capital gains requirements on breeding stock has been made more liberal and simplified.

(11) RECORD OF CASH DISBURSEMENTS

				CHECK NO	AMT OF CHECK	AMT TO FARM	LABOR HIRED	FEED, HAY PURCHASED	SEED + PLANTS	MACH HIRE
1	NOV	V	MT. WASHINGTON MACHINERY	C2067	257 90	257 90		257 90		
2		2	SMALL ANIMAL HOSPITAL	W207	146 75	146 75				
3		3	ALMGRA	W208	200	200				
4		3	WHOLESALE PETROLEUM	Cash	1908	1908				

items, the right-hand one for totals. At the top of the page, above each of these double money columns can be written the name of an account such as "feed purchased for stock" or "cost of repairs."

Harry Olson got a bookkeeper to help him set up his books to start with. All that he required was that they be simple enough so that he wouldn't get bogged down in paper work. After studying the farm operation so that the books would fit the farm, Olson and the bookkeeper arranged the day book into three divisions, a record of disbursments, a record of cash received, and a summary. The accounts were set up in the 18 columns of two 11 by 13 inch pages. Because of the number of accounts they wanted to use they decided to use each of the double money columns as an account column and to make the totals stand apart by ruling double lines at the bottom of the columns at the end of each month and then entering the total in different colored ink.

The record of disbursements was set up as shown at the top of pages 72 and 73, so that the first column was for the date, then a space for the name of the person to whom the money was paid, then the check number, the amount of the check, the amount to the farm (this column was put in so that Olson could divide the gas, electricity, telephone, and other such bills into the amount which was used by him and his family and the amount which could be legitimately listed as a farm expense in figuring taxes); then columns for the various accounts: such as labor hired; feed purchased; seeds and plants; machine hire; supplies; repair and maintenance; fertilizer and lime; veterinarian and medicine; gasoline and oil; water, electricity and phone; freight, express, trucking; livestock registration and tests; livestock purchases; miscellaneous.

The record of cash received was also spread over two facing pages. In this section there were columns for the date; for the name of the person from whom the money was received; the amount; and for the different farm enterprises which produced the income such as dairy products, chickens and eggs, crops (with space for noting the kind and the amount), miscellaneous farm income (with space for listing the kind and amount), sale of livestock raised, and sale of livestock purchased. The purpose of breaking down the livestock sales into those which had been raised on the place and those which had been purchased and later sold was for the purpose of figuring taxes later.

The summary for the year consisted of monthly and annual totals for each of the accounts listed in the expense and income sections. It also had the depreciation schedule for the farm which showed the depreciation on buildings, livestock, ditching, fruit trees, machinery and equipment, and fencing. For each of these items the bookkeeper and Olson arranged columns showing the date of purchase, the cost, the depreciation allowed in prior years, the remaining cost, the rate of depreciation per year, and the depreciation allowed this year. A barn which was built in 1937, for example, was shown to have cost $2,000.00, to have been depreciated $960.00 to date, to have a remaining cost of $1,040.00, to be depreciated at a rate of 4 per cent, and to have an allowable depreciation of $80.00 this year.

"There are accounting systems on the market which are set up for a year's bookkeeping," Olson said. "They have printed columns for the different accounts just like I have on my form. I like mine a little better, however, because mine are arranged to fit my particular farm."

When any good day book system is carefully followed throughout the year it will give the complete record of all cash transactions. But if a farmer wishes to know the expenses and the income for any particular enterprise it will be necessary for him to go through the year's records and pick out all the items which relate to this particular project. In order to put this information into a form which can be studied and used, a ledger sheet should be kept on each enterprise showing the day to day expenses and income. Over the years these ledger sheets will give a valuable comparison between enterprises and between different periods with the same enterprise.

In considering setting up a cow-calf enterprise, Harry Olson is able to look back three years to a similar small project he had at that time. He has records to show the cost of the six bred Angus heifers he bought at that time—and it'll be a long day before he gets such a buy again—the cost of the hay, mineralized salt, calf pellets, and the amount of each which were consumed. He has a good record of the labor costs involved as well as the incidental expenses such as a veterinary fee for castrating. He also has the pasture rental which he charged against each cow and calf. Finally he has the weight and sale price of the 12 animals.

This single record was of real help to Olson in making a decision as to this year's feeder cattle; when he has several such enterprise records their value will be far greater. In day-to-day operations and in planning the production program for the seasons ahead, farmers need to know the answers to a great many questions on which their own past experience is the best guide. It is at such times that the palest ink will jog the average memory

13 RECORD OF CASH RECEIVED 1957

DATE		FROM WHOM RECEIVED	AMOUNT	DAIRY PRODUCTS	CHICKENS EGGS	CROPS KIND	CROPS AMOUNT
JAN	1	FAMILY (7½ gal)	7750	7750			
"	10	" (31 doz)	1550		1550		
"	1	HORSE MAINTENANCE	2400			HAY CORN	

	REPAIR & MAINTENANCE	RENT & LEASE	VETS, & MEDICINE	GASOLINE & OILS	WATER ELECT & PHONE	FAT, EXP. TRAVEL	LIVESTOCK REG & TESTS	STOCK PURCHASED QUANTITY	AMT.	MISC. DESC.	AMT.	
												1
15 00			131 70									2
								200				3
			14 08									4

A DAY-BOOK ARRANGEMENT which simplified accounting is shown above and at the page bottom. The accounts, similar to the tax form accounts, are spread over two pages so that daily entries can also be entered in the account column.

and all of the facts may then be considered.

Comes the Tax Man

It is at tax time that records are worth their weight in sweat; at tax time and a year and a half or so later when the tax office may ask you to back up your form with some records. A farmer who can show a complete set of records listing every source of income from the sale of a dozen eggs to the prize money won by a goat at the county fair and show every expense from the purchase of a snow shovel in January to a Christmas bonus for the hired man is definitely in the driver's seat.

Farmers may keep their records and report their taxes on either the "Cash Receipts and Disbursements Basis" or "Accrual Basis." Those who never filed a return before have the option of using either basis providing adequate records have been kept. Those who have filed before have established a basis for filing and cannot change to the other without the consent of the Commissioner of Internal Revenue.

Over a period of years, the accrual basis of accounting usually results in a more uniform taxable income than the cash basis. Livestock breeders and feeders, grain farmers and growers of fruit, vegetable and other cash type crops which may be stored and sold in the next year, may find it desirable to use the accrual basis of reporting rather than chance the possibility of having to pay tax on income from the sale of crops and livestock produced prior to but sold during, the taxable year along with the current year's production. On such farms as dairy and poultry farms, where the income is relatively constant from year to year, the

(*Continued on page* 128)

A COW WITH A PEG LEG is still a capital asset. Her new elephant-hide and steel leg and the cost of fitting it can be charged to veterinary fees. Dr. Byron Bernard of Park Hills, Ky., who made the leg for this grade cow, did it to show that artificial legs might be made to save good breeding stock.

CASH RECEIVED 19

MISC. KIND	FARM INCOME AMOUNT	SALE OF LIVESTOCK RAISED KIND	QUANTY	AMOUNT	COST	SALE OF LIVESTOCK PURCHASED DATE BOUGHT	DATE SOLD	AMT	ANIMAL	
										1
										2
BOR	6 00									3

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WET NURSING PIGS

(*Continued from page* 63)

soon as they started drinking this milk with an antibiotic in it, their scours cleared up and they started gaining. I know they'll get antibiotic in their creep feed, but they take to it better in milk."

The particular synthetic milk fed at Little Sister Farms comes in powdered form to be mixed with warm water. "We found an easy way to do this mixing," Haggerty said, "in an old washing machine. Come on back and let me show you how it works. We're always mixing a new batch." In the feed room, the washing machine was backed into a corner near a short length of hose attached to the hot-water pipe.

He turned the tap and let the warm water fill the tub to a 15-gallon mark he had scratched on the side. As he leaned over the machine's tub and measured out 20 pounds of powdered milk, Haggerty looked like an outsized, sun-burned laundress dumping in enough soap powder for a year's wash.

"One trouble you run into with this particular formula is that the fat separates from the rest of the milk if it's allowed to stand, or if you mix it too long. We mix for exactly two minutes," he said, starting the machine churning, "and the pigs get it fresh every feeding.

"The baby pig brooder came equipped with a storage bottle for water and one for milk. We discarded the milk bottle and pour the liquid directly into the trough. Some mechanical means of mixing the stuff is an absolute *must* when you're feeding as much as we are, and the washing machine works out very well. I don't know how long it'll last, but we should get an awfully good trade-in allowance on the wringer."

Some of the sow's milk substitutes contain less antibiotics such as aureomycin and penicillin than others. The manufacturers of these particular formulas are keeping the antibiotics at a minimum in order to keep from coming under the scrutiny of the pure food and drug administration. Compensating for these "shortages," some farmers buy antibiotics loose and add a little extra to each mix. The amount to add depends on the amount already in the mix. The veterinarian would be the best adviser on this question.

At present, Little Sister Farms is operating at the rate of four sows farrowing each day, which means that every day four brooders are emptied into the stalls and almost every day 30 to 40 weaned pigs are sold at $16 apiece to one of the Little Sister Farms or to commercial hog feeders. Out of the first 408 pigs put through this system, eight were lost. Out of the next 300 pigs put through, ten were lost due to pneumonia.

"There's no question about it, we've had some good luck to make a record like that," Haggerty admits as he tells you the figures, "but not all of it is luck. Part of

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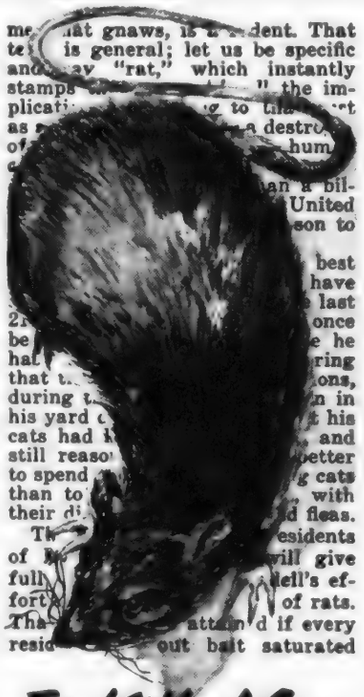

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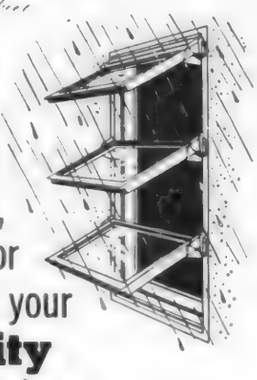

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the record is due to careful sanitation, warm pens which are free from drafts, and good feed."

Sanitation

The biggest losses still occur during the first two days when the pigs are still with the sow. These are being reduced by putting the sow into a farrowing crate for her two-day period as a nursing mother. Sanitation is one of the major factors in controlling losses after the pigs are taken from the sow.

Each day the growing-pens are flushed out and fresh corncob litter is put in for the growing pigs. All of the pens are periodically sprayed with benzene hexachloride, and each day the pens are sprinkled with pulverized limestone which inhibits bacterial growth and acts as a deoderant. Every two days, the trays and trough of the wire brooders and the feeders in the pens are steam-cleaned as are the floors and walls of the growing-pens whenever they are vacated. The pigs are vaccinated for erysipelas at around two weeks of age and are vaccinated for cholera with modified live virus vaccine at five to six weeks.

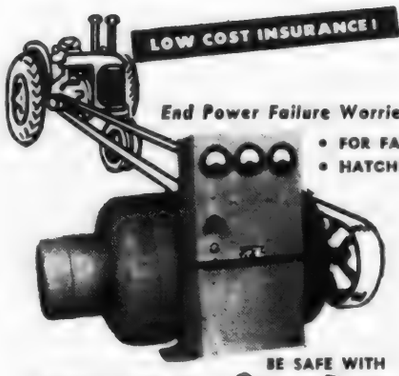
Swine men who know the danger of spreading disease are rather appalled at the easy going hospitality shown to visitors by William Cooke, the owner of Little Sister Farms, and Fran Platt, the manager, but visitors *are* required to put on plastic overshoes before walking through the hatchery.

Three Litters a Year

Pigs are being weaned weighing 40 to 60 pounds at a cost of around $4.00 per pig for the milk plus creep feed, and, most important of all, they do it with losses as low as two and three per cent and are able to breed the sow again at from three to twenty-one days which means two and a half to three litters a year per sow.

If the sow were a better mother, there would be little reason for producing an artificial milk, but she loses 20 to 30 percent of her young before they are weaned. Among the survivors are usually one or two runts she couldn't properly feed. The ponderous sow may kill several of her pigs herself by crushing them, or occasionally trampling them in a fit of nervous anxiety. Those that she raises to weaning time average 20 to 25 pounds at 56 days. Being an average, this means that many farmers do much better than this with their pigs, but it also means that 20 pounds would be heavy for many pigs weaned.

Though she is a poor nurse, the sow is a prolific pig manufacturer which is one of the major reasons for artificial sow's milk. Relieving the sow of the nursing chores of motherhood makes it possible to breed her again within a matter of days. Most sows come in heat three days after farrowing if the pigs are removed from her pen. Bred at this time, some will catch, but most will have to be bred again within 21 days. The greatest drain on the sow comes from nursing her young.



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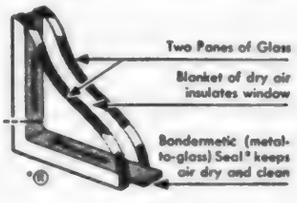

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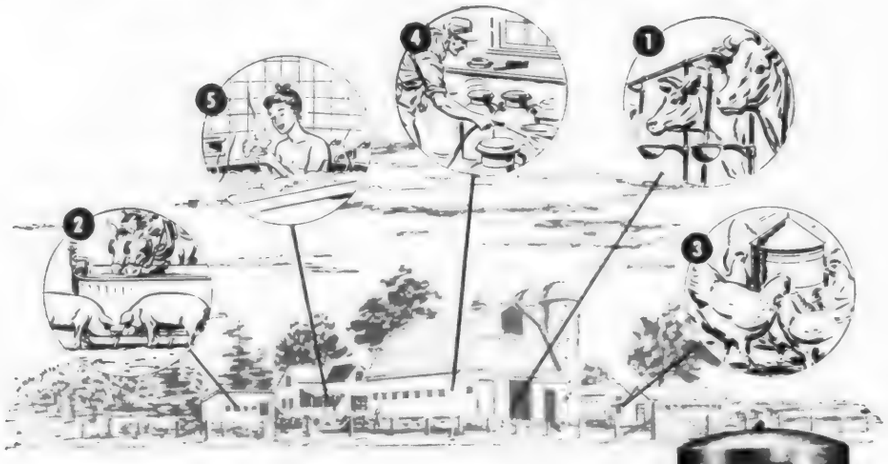

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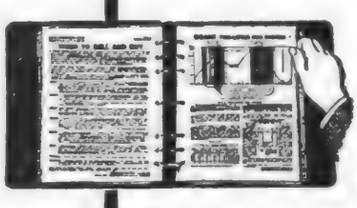

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She eats as much feed during the 56-day nursing period as she does during her 112 days of gestation. When the pigs are taken from her, she dries up without any trouble and turns to the easier job of producing a new litter.

Al Haller, manager of a pig hatchery at Sun Prairie, Wisconsin, feeds the new milk right down the line, but with a variation of his own. "My experience with synthetic milk is that the honeymoon is over," says Haller, who was one of the first to start feeding this new material. "Like penicillin, the sulpha drugs, and antibiotics in feed, synthetic milk is a wonderful additional tool to the hog producer, but it is not a cure-all."

"Here's how we use our synthetic sow's milk," Haller continued. "The first five days the pigs nurse the sow—then the pigs are fed artificial sow's milk in warm water three times daily. At seven to ten days, they are fed a creep feed containing the dry artificial sow's milk, oat groats, and cracked corn. As soon as they are eating a pound of the creep feed each day, the liquid milk feeding is discontinued. In this way the liquid milk, which is hard to handle, is fed for a shorter period of time. But they don't stop getting the benefit of the new milk. The dry artificial sow's milk is used in various proportions with grain, soy bean meal, and minerals right up to market. We are also using it in self-fed rations to dry and milking sows.

"In this way," he concluded, we use artificial sow's milk in our entire feeding program from the five-day pig clear through to the five-month old butcher hog."

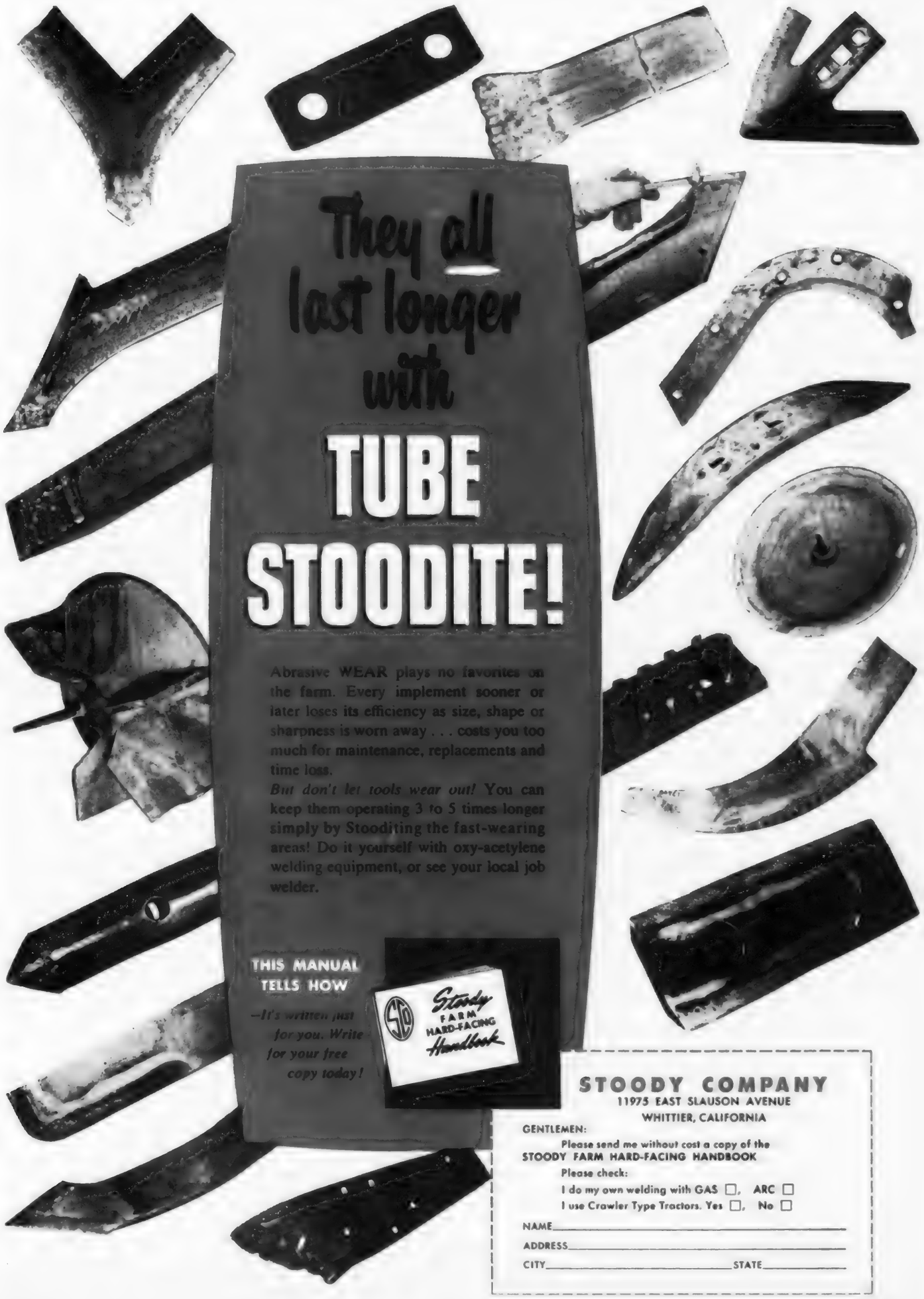
Some Folks Don't Like It

Criticism of the artificial sow's milk usually falls on both the producer and the consumer. The producers are usually criticized for the high price of their product.

Research departments of the various companies who manufacture the new milk are working on methods of reducing its cost. Efforts to find cheaper sources of protein without reducing the quality of the milk are being tried, so far without success.

The exact cost of producing a pig is very hard to estimate since efficiency, pigs saved, and labor costs are all variables along with the cost of feed. A man with a mathematical bent at the Charles Pfizer Company presents these figures to show that even at today's prices pigs can be raised more cheaply on synthetic sow's milk.

	Sow Fed	*Terralac Fed*
Average number farrowed	8	8
Average number weaned	6.5	7.5
Cost		
Sow's gestation feed	$33.00	$33.00
Feed for rebreeding or market		3.00
Sow's lactation feed	38.00	
Reconditioning feed	10.00	
Terralac for litter (12½ lbs. per pig @ 40 cents a lb.)		36.10
Starter for litter (30 lbs. per pig @ 5 cents a lb.)		11.25
Total feed cost	$81.00	$83.35
Cost per pig	$12.55	$11.10



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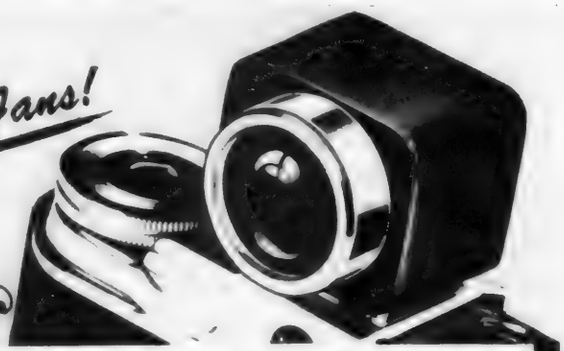

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A second criticism is that users of the product have been oversold to the extent that they believe artificial sow's milk will take the place of good management and sanitation. "I have seen baby pigs practically swimming in muck in a cold pen," one University Extension Specialist said. "The people were under the delusion that the synthetic milk with its antibiotic would take care of everything. We're going to have a lot of failures with this new material—which I think has real possibilities—until people realize that without the warm sow in the pen, you've got to supply heat and you've got to protect the pigs from draft. Farmers have got to realize that artificial sow's milk is a good breeding place for germs and even more careful sanitation must be practiced when you use it than when you don't. This new product *can't possibly take the place of good management.*"

One of the men at the Little Sister Farms gave a humorous parody of this overselling of the product when he held up a mouse and said, "This is what our pigs looked like before feeding them antibiotics."

At present there are a number of sow's milk replacements on the market, and more are bound to come. Here are the trade names of those which can be bought today, along with the name and address of the manufacturer:

"Terralac," manufactured by Chas. Pfizer & Company, Inc., 11 Bartlett Street. Brooklyn, New York; "Semi-Solid Sparx" and "Dry Sparx," manufactured by Consolidated Products Company, 119 N. Washington St., Danville, Illinois; "Pig Milk Replacement," manufactured by Land O'Lakes Creameries, Inc., 2215 Kennedy Street, N.E., Minneapolis, Minnesota; "Piggy Milk," manufactured by Merchants Creamery Company, 536 Livingston, Cincinnati, Ohio. "F. M. S.," manufactured by Farmer's Marketing and Supply Company, 5903 Northwest Highway, Chicago, Illinois.

On the credit side of the ledger, artificial sow's milk, when properly used, produces heavier pigs. At eight weeks of age, the normal weaning time with sow-fed pigs, the pigs on synthetic milk will average around forty pounds, some of them weighing as high as sixty pounds. More pigs will be saved, losses being as low as two to five per cent as compared to twenty-six per cent in our good hog states and near a third lost as a national average. There will be fewer runts because of the antibiotic in the feed and because the weaker pigs will have a better chance at the milk than they do with the sow. The pigs will be healthier because of the antibiotic and because they will be removed from the sow, thereby avoiding those diseases which are passed on from the sow to her young, such as erysipelas and infectious atrophic rhinitis. Finally, the sow, relieved of her nursing duties, will be able to produce almost a third more pigs each year.

THE FARM HOME

farm cheese from surplus milk . . .

I remember, I remember

By Thomas Hood

I remember, I remember,
The house where I was born,
The little window where the sun
Came peeping in at morn . . .

I remember, I remember,
The shade trees dark and high;
I used to think their leafy tops
Were close against the sky.

MAKING CHEESE FROM SURPLUS MILK

By Joann Bell Pierce

LIKE BEN GUNN, the castaway in Stevenson's *Treasure Island,* many of us from time to time crave a "good Christian cheese." In this respect we are little different from the people who have made cheese on farms for thousands of years. Although cheesemaking moved into the factory a hundred years ago, it still can be made at home with surplus milk and a little homespun equipment.

Making cheese on the farm calls to mind the cloth filled with curd and whey hanging in some cool spot of the farm kitchen or porch with a particularly curious kitten sampling the whey as it spatters to the pan beneath. Mixed with thick cream, the curd came to the table as "cottage" cheese or "smeerkase." The process is still a familiar one because cottage cheese is the easiest type to produce with small amounts of skim milk, but cheese making at home is by no means limited to this soft variety.

At five dollars a hundred pounds, whole milk, surplus or not, is pretty expensive stock and poultry feed. Producing cheese from milk which has been going to the hogs and chickens doesn't mean that it is lost as feed. The whey, byproduct of cheesemaking, has enough nutritional value to make good stock feed and is fine for mixing wet mashes. Ten pounds of whole milk yields about one pound of hard cheese. In the nine pounds of whey left there are about 1,080 calories, 376 grams protein, 13 grams total fat, 209 grams carbohydrate, 20 grams total ash, calcium, phosphorus, and Vitamin A. The majority of thiamine, riboflavin and niacin found in milk remains in the whey. So we can still feed the whey and have cheese for our pie, too—a fine turn of events if you agree with the old English rhyme, "An apple pie without some cheese is like a kiss without the squeeze."

Cheese is a high protein food which may be alternated with meat for economy as well as variety in the family's diet. One pound of American cheese, for instance, has as much protein as about 1½ pounds sirloin steak and supplies as much energy as 2 pounds sirloin.

Equipment Needed

To make the cheeses best suited for farm and home production, you will need these basic pieces of equipment:

A dairy thermometer. A glass-bodied floating thermometer is ideal because it can be easily washed and cleaned. They are available at dairy supply houses.

Rennet tablets. Rennet is the enzyme which curdles milk and is found in the stomachs of ruminants. In the old days the fourth stomach (called the rennet) of a calf that had been butchered was cleaned thoroughly, stretched and dried. When a cheesemaker wanted some rennet extract he simply took a piece of the dried "rennet," soaked it in luke warm water, then used the rennet mixture to curdle his milk. Today both liquid rennet and rennet tablets may be bought at the drugstore, dairy supply dealers, or from Hansen's Laboratory, Little Falls, N. Y., or 9015 W. Maple Street, Milwaukee, Wisconsin. A box of 25 cheese rennet tablets costs around $1.25 and is enough for about 200 gallons of milk.

Cheese color. Both cheese and butter color are made from a resinous material which coats the seeds of a Central American tree. Butter color should not be used as a substitute for cheese color because the oil base used in it does not mix properly with the milk and causes a spotty or mottled looking curd. Cheese color may be bought from dairy supply firms.

A container which holds at least 5 gallons. An enameled bucket, large pressure cooker or canner will serve the purpose. If it is not made of heavy material, a second larger container should be filled with water and used to make a double boiler.

A long-bladed knife. It should be long enough to reach to the bottom of the milk bucket to cut the curd.

A cheese hoop. A straight-sided gallon syrup can, or any size straight-sided can, is a good substitute. Punch several small holes in the bottom so that the whey may drain easily.

A wooden follower. This is a round piece of smooth, clean, hard wood slightly smaller in diameter than the hoop, which is placed on top of the curd in the hoop before it is pressed. If the cheese is pressed without using a hoop, the follower is unnecessary.

A cheese press. A lard press may be used, or one of the presses illustrated may be improvised with scrap lumber and a few bricks.

Salt. Coarse dairy salt is good, but ordinary table salt may be used.

Cheese cloth and muslin cloth.

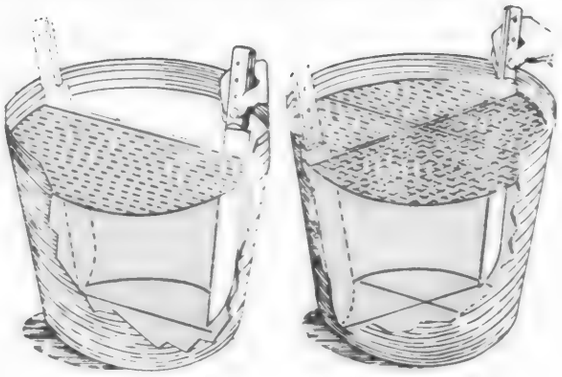
Paraffin. The same type used for jelly and preserves is suitable.

General Pattern for Cheesemaking

From the beginning of cheesemaking, methods differed with the part of the country—and the part of the world—in which it was produced; as a result particular types of cheese became associated with definite regions. Today there are some 400 cheeses by name, but they represent only about 20 distinctly different kinds of cheese which may be classed as hard, semi-hard, and soft. Although each of these many cheeses has its own particular recipe, they all follow, generally, one basic process—a given amount of milk is curdled; the curd is cut, heated, salted, pressed and cured.

First, good clean whole milk from cows or goats in good health is essential for making a first class cheese. The milk should be properly cooled when it is held overnight and all utensils used in handling the milk and making the cheese should be sterilized. Colostrum is completely changed in composition and properties and should not be used for cheesemaking. Neither should milk be used from

MRS. JOHN STOTZER cuts one of the bricks of Swiss cheese made by her husband on their Alpine View Farm near New Philadelphia, Ohio. The Stotzers' cheese recipe was given to them by an old Swiss cheesmaker. Much of the milk from their big herd of Holsteins goes into cheese which is sold as a farm specialty.

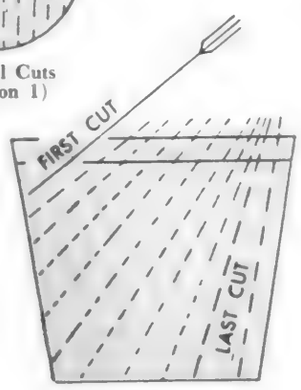


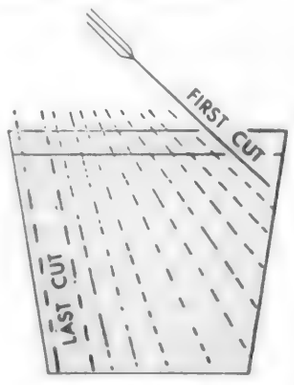
POSITION 1 POSITION 2

TO CUT the cheese curd, use a long-bladed butcher knife or spatula. Cut vertically into ½-inch squares, as shown in Positions 1 and 2.

Original Cuts (Position 1)

POSITION 3: Holding the knife at an angle, slice the curd into ½-inch pieces. Cut again from the other side, as in Position 4.





POSITION 3 POSITION 4

mastitis-infected cows. It coagulates slowly with rennet, forms a soft curd and makes a weak-bodied cheese. If the cows are being treated with penicillin, aureomycin, and other antibiotics there is usually enough of the drug in the milk to slow down normal cheese bacteria growth and cause trouble in cheesemaking.

The type of bacteria in milk plays an important role in the flavor that develops in cheese while it ripens. The present trend is toward pasteurizing the milk although much of the hard and semi-hard cheese manufactured in the United States has been made from unpasteurized milk. Cheesemakers declare that disease-causing bacteria which may be in the milk lose vitality and die within a few months under proper curing conditions. They say also that hard cheese made from pasteurized milk does not develop a satisfactory flavor; however, tests have proved that American cheese made from pasteurized milk does develop, under controlled conditions, an acceptable flavor, is more uniform in quality and can be ripened in a shorter time than cheese made from unpasteurized milk.

Milk may be pasteurized by heating it to 143° F. and holding it at that temperature for 30 minutes. The container of milk should be placed in a larger pan of water to prevent scorching while heating.

In pasteurizing milk good bacteria which account for the flavor of cheese are destroyed as well as the harmful bacteria. To replace these flavor-making bacteria, or to make the milk more uniform when several batches are mixed, a "starter" must be used. Starter is clean, sour milk or a culture of bacteria which produces lactic acid in milk. Both liquid and powdered cultures are available at a dairy supply house and may be used successfully by following directions which come with each type. Clean buttermilk may be used or a "natural" sour milk starter may be made at home. To make the starter scald several pint jars. Pour clean fresh milk into the jars, cover, and let stand at 70°-80° F. until the milk thickens. This may be from 12-48 hours. Throw away any of the curds which have gas holes or in which the whey has separated from the curd. Select as a starter only the firm white curds which have a clean acid flavor. A poor quality starter is worse than none at all.

After the starter is added, color is stirred in for some cheeses. Then enough rennet, diluted, is added to the milk to form a firm curd within 25-40 minutes, depending on the cheese being made. For some soft cheeses a smaller amount of rennet is used and the milk sets for several hours. The curd may be tested for firmness by pressing it near the edge of the pan with the back of the hand. If the curd breaks cleanly away from the side of the pan, it is ready to cut. Another method is to put the forefinger in the curd at an angle and lift it. If the curd splits sharply over the finger and clear whey fills the break, it is ready to cut.

The curd is cut in small pieces about ½-inch square. Cheese factories use curd knives—a framework of steel with thin wires strung tautly at intervals. The home cheesemakers may use a kitchen knife. Cut the curd straight up and down crosswise, lengthwise, and then, holding the knife at an angle, cut it both ways again.

Heat, if called for, is applied slowly while the curd is stirred gently. This combination of heating and stirring helps expel the whey from the curd particles leaving them smaller, firmer, and meatier in texture than they were when first cut. The final temperature to which the curd is heated, because it affects the amount of whey left in the curd and the texture of the curd, helps determine the type cheese. A few degrees one way or the other can

DILUTE rennet in cold water and pour into the milk, mixing thoroughly. Let it stand in a warm, draft-free place until a firm curd forms.

TO TEST curd for firmness, insert a finger at an angle and lift. The curd splits sharply and whey fills the break if it is ready to cut.

TO PRESS cheese without a hoop, make a cloth bandage 3" wide and wrap around a ball of curd. Pack the curd down until the top is smooth.

change entirely the finished product, therefore temperatures should be controlled closely.

The lower the temperature, the more whey will be left in the curd and the softer will be the finished cheese. The higher the final temperature, and the longer the curd is held at this temperature, the drier and harder the cheese will be when cured. Italian Parmesan cheese, for example, is heated to about 125° F. and is a hard cheese suitable for grating. Brick cheese, classed as a semi-hard cheese, is heated to about 102° F. and is firm enough to slice easily, but not hard enough to crumble. The final temperature for Camembert, a soft creamy cheese, is 78°-87°, depending on the cheesemaker's choice.

The whey is drained off after heating and, if the curd is to be salted with dry salt, the salt is added. Some cheeses are salted after pressing by floating in a tank of concentrated salt solution. After draining and salting, the curd is put into the hoop, sometimes lined with cheese cloth, and pressed. When as much whey as desired is pressed out, the cheese is placed on a shelf to dry on the outside and form a rind. It is usually paraffined following drying and placed in a curing room where it stays, under certain temperature and humidity conditions until it has attained the characteristics peculiar to the individual type cheese.

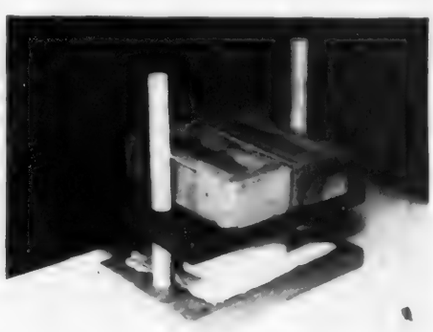
Mrs. Baer Makes Cottage Cheese

Cottage cheese is the specialty of Mrs. Lee Baer of New Baltimore, Ohio. There was a time a few years ago when it was almost a daily process and when she had as much as three big gallon crocks of the cheese in her refrigerator at once, all made from the milk of their one cow.

"As much as my family likes cottage cheese, we couldn't take care of that much, so I started selling it to my neighbors," she says. "I sold the cheese for 25 cents a quart, with lots of thick sweet cream added, which almost ruined my profits. You can see that, by today's prices, it was more of a service to friends and an outlet for surplus milk than a profitable business.

"I've always found that people who are not in the dairy business—we raise a lot

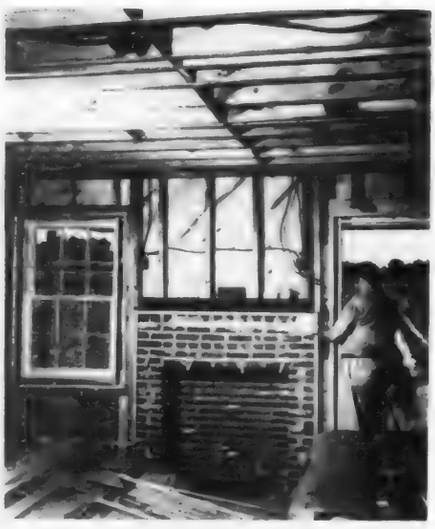
(*Continued on page* 92)



THIS homespun press for unhooped curd is made of scrap lumber and bricks. RIGHT : Draining cheese the old-fashioned way has made many a kitten purr.

SAFE ELECTRICITY

The farmer's day is extended and his wife's housework is eased with electricity. Safety and economy are achieved with proper wiring.



ELECTRICITY, it has been said, is science gone crazy with the heat: if you can just understand its maneuvers you can make it do almost anything around the farm. Although we can measure electricity, transmit it, control it, and make it work for us, no one knows exactly what it is. We do know it is a form of energy so well behaved that it can be turned into any other form of energy we need—heat, light, sound, or movement. On the unscientific side, we know that electricity is one thing farmers buy which has gone down in price.

Electricity is no longer a luxury. If used intelligently it pays its way and leaves a profit. However, bad workmanship, poor materials, faulty wiring, and careless handling all add up to danger, inefficient service, and a loss of power.

The electrician has a language all his own. Here are some of the words he uses:

AMPERE, a measure of the flow of electricity through a wire. This may be compared to the flow of water through a pipe measured in gallons per minute.

VOLT, the measure of electrical pressure. Just as a given number of pounds pressure will cause so many gallons of water per hour to flow through a given pipe, so will a specific number of volts pressure cause a certain number of amperes of electricity to flow through a given wire.

WATT, a unit of electrical power. A measure of the ability of electricity to do work. It is the product of volts times amperes. For example, if 10 amperes flow through a wire under 115 volts pressure, the electrical power will be 1150 watts.

pressure and a ½-inch pipe to carry the water from the tank ½ mile to the garden. When you turn on the faucet expecting to get a good stream of water, you will get only a dribble. The 40 pounds pressure is lost by the water trying to push through the small pipe over that distance. Replace it with a 2-inch pipe and you will get enough water to sprinkle the garden.

You lose electricity—and money—when you try to carry the load over long distances in wires which are too small. Replace them with wire of the right size and electricity flows again under the right voltage.

ALTERNATING CURRENT, energy that flows in one direction through the circuit and then in the opposite direction, changing its direction of flow a certain number of times per second, usually 50 or 60.

DIRECT CURRENT, electrical current which flows in one direction only.

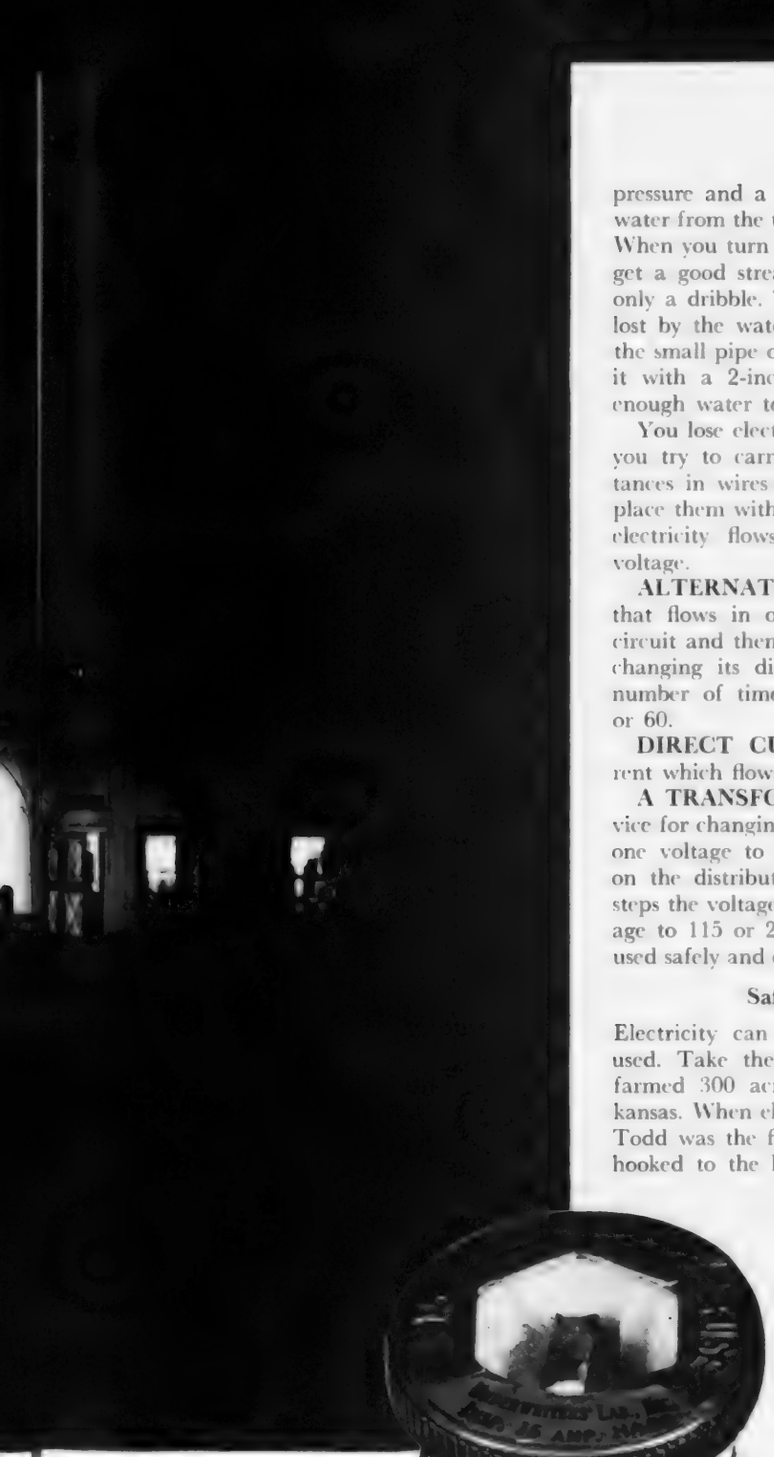
A TRANSFORMER, an electrical device for changing alternating current from one voltage to another. The transformer on the distribution line near your house steps the voltage down from a higher voltage to 115 or 230 volts so that it can be used safely and conveniently.

Safe Electricity

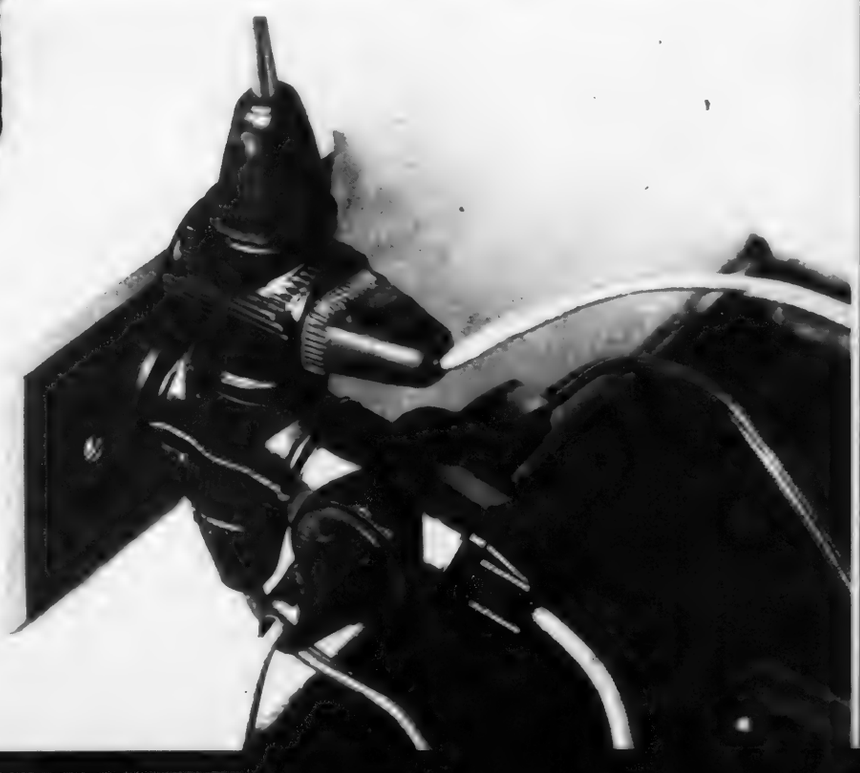
Electricity can be a hazard when misused. Take the case of Ben Todd who farmed 300 acres near Fayetteville, Arkansas. When electricity came out his way Todd was the first man to have his farm hooked to the highline. He was the first again to put in electric milkers and coolers, the first who tried an electrically powered hay drying fan. His neighbors said that the way Ben Todd put electricity to work for him made him the most successful dairy farmer in the county. But one evening when he was cleaning up after a hot day in the field he tried to turn on the light while still in the bathtub. A faulty installation, plus the water and the grounded piping connected to the tub made a perfect set-up for death. Todd never knew what hit him.

Few people realize how small an electric current is needed to cause death. The ordinary 115-volt lighting circuit can be as deadly as 40,000 volts. It is amperage (amount of current) which kills, not voltage (electrical pressure).

The general rule should be to use appliances far enough away from water and faucets so that one cannot touch either the faucet or the water and the appliance at the same time. When remodeling an old bathroom or kitchen, or installing a new one, a wall switch near the door is safer than a pull-chain at the fixture which may be over the sink or the lavatory. The National Electrical Code specifies that all electrical fixtures in the bathroom must be grounded, but precautions should still be taken. Electric fixtures, wall switches, and cover plates in bathrooms, kitchens, or laundry rooms should be porcelain, bakelite or other insulating material. Pendant sockets made of insulating materials are preferable to metal types in damp locations or in the vicinity of water. When pull-



THE FUSE IS A SAFETY VALVE for each circuit in the electric system; choose the right amperage for the job and one which has been inspected by Underwriters' Laboratories. The electric octopus (below) in a farmhouse is dangerous and expensive. It is far cheaper and safer to install proper wiring when the house is built (opposite).

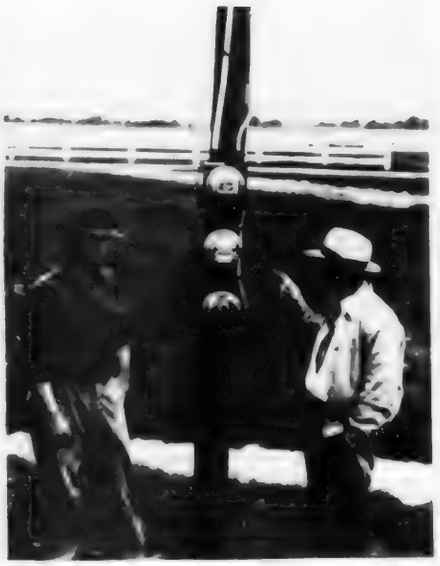


ONE KILOWATT equals 1000 watts. It is generally used to measure electricity since the watt is a very small unit. A kilowatt hour equals 1000 watts used for one hour.

CIRCUIT, path through which electricity travels. A break in the circuit which prevents flow of current is called an open circuit. When the current returns to the source through a bypath, a short circuit results.

VOLTAGE DROP, the loss in pressure which occurs when electricity flows through a wire. Wires are the paths for electricity, just as pipes are the paths for the flow of water. You may have a 500-gallon pressure tank with water under 40 pounds

DEATH IN THE BATHTUB can come from such foolish mixing of water and electricity.



THE METER POLE should be in the center of the farm electrical layout.

"IN GOD WE TRUST" is the inscription on the coin, but that doesn't cover using it as a fuse.

chain switches are used, see that they have an insulated link or cord.

Electric washing machines present special safety problems because they must keep company with both water and grounded piping systems. A worn cord may bring a wire in contact with the metal frame and the washing machine will become "alive."

All washing machines, regardless of location, should be grounded. There are two quite simple ways to do this. One method requires a three-prong plug with suitable outlet and a three-wire rubber-covered cord long enough to reach from the washer to the outlet. This three-wire cord carries the two usual wires for current plus the grounding wire, so that when the washer is plugged in it is automatically grounded.

A second method requires one or two ground clamps, available at most hardware stores, and a No. 14, 12, or 10 electric wire long enough to extend from the leg of the washer to the nearest metal water pipe. Remove the paint from a small area of the washer leg and attach one end of the wire using a clamp. Or a hole can be drilled out and the wire fastened to the leg with a metal screw or bolt. Connect the other end of the wire to the water pipe using the second clamp. With such a connection as this, any failure of insulation which might create danger will be indicated immediately by the blowing of the fuse.

The fuse is a small link of soft metal which melts when too much current passes through it, thus breaking the circuit. It is situated in a fuse box at the spot where electricity enters the house from the outside.

Only a Fuse Protects

When replacing a blown fuse, remove the appliances from the circuit involved, open the main switch and, standing on a dry surface, unscrew the fuse with one hand and replace with another of the proper size. Keeping enough spare fuses of the right sizes on hand will forestall any impulse to let a penny double for a fuse or to replace with a larger fuse than should

MINIMUM RECOMMENDATIONS FOR OUTLETS AND SWITCHES

PLACE	OUTLETS FOR LIGHTS	SWITCH LOCATION	CONVENIENCE OUTLETS	SPECIAL OUTLETS
Porches	One overhead or two on either side of door	Inside door. For back porch also at barn and garage	One for each 15 linear feet of house wall bordering house	
Halls	One outlet for each 15 linear feet	Inside hall door	Outlet for each 15 linear feet	
Stairways	One outlet on each floor	At head and foot of stairway		
Closets	One outlet in closets 3 feet or more deep or having floor area of 10 square feet or more	Pull chain		
Living Room	One ceiling outlet—wall outlets as desired.	Each main door	One for each wall space but not further than 12 feet apart	Required for FM Radio, Television
Dining Room	One ceiling outlet over table	Each main door	One for each wall space but not more than 20 feet apart	
Kitchen	One ceiling outlet—outlets at sink, range, dining center, etc., as desired	Each main door (3-way switch)	One outlet for every 4 linear feet of work surface. One at refrigerator location.	Required for electric range, dishwasher-disposer, home freezer, clock, ventilating fan
Bathroom	Outlet each side of mirror. Ceiling outlet in shower compartment	Inside door. Outside of shower compartment	One near mirror	Required for Built-in Heater
Bedroom	One ceiling outlet	At door	One for each wall space but not more than 12 feet apart	
Attic	One outlet for each enclosed space	At bottom of stairs	One for general use	
Basement	One outlet for each 150 square feet of open space plus one for each room. One for work bench and one for furnace location	At head of stairs. At each room door	One at work bench. One at furnace location	
Garage	One interior outlet for each two cars. One exterior outlet if garage is detached from the house	At door. At house if garage is detached from house	One for one or two car garage, plus one for each additional two cars	
Yard Light	Outdoor type on pole	At house, barn, garage		

be used. Tampering with fuses in this way is like putting a clamp on the safety valve of a steam boiler.

Three types of plug fuses are used today. The ordinary plug fuse has practically no time lag. It blows at the instant of overload. The time-delay plug fuse (Fusetron) has a time lag following overload before it will blow. This short overload period will provide the extra current necessary to start a motor without service interruption. On a direct short, however, it will blow instantly. The time-delay plug fuse with a special adaptor (Fusestat) provides two additional safety features. The adaptor for the correct amperage rating locks into a standard fuse socket so a coin or larger fuse cannot be used. It makes safe protection remain safe.

For convenience, automatic circuit breakers are a good protection for new and remodeled homes. They have the advantage of being tamperproof and do not have to be replaced after operation. After the trouble is locatted, simply resetting the tripped switch continues service. Circuit breakers are installed on a panel and are placed in the wiring system much as a fuse box would be.

When a fuse blows or a circuit breaker trips it may be due to an overload or a short circuit. In the first case if too many appliances are connected to one circuit, more current will be drawn through the supply wires than the wires were meant to carry, and the overloaded wires become hot. The fuse, if it is a proper size for the circuit, will blow, protecting both wires and appliances.

When the path of electricity through a circuit is changed, accidentally or otherwise, so that the current can take a shorter or easier way than usual, a "short circuit" results. This shorter path lowers the resistance to the flow of current. As resistance is lowered the rate of flow of current increases at once. If the short lowers the resistance so much that the flow of current is greater than the capacity of the fuse in the circuit, the fuse will blow. If the fuse is too large or fails to operate, the wires become hot enough to ignite the insulation and cause fire.

Up to this point electricity has been discussed in the light of personal safety. Of major importance is the damage to property and the loss of equipment, feed, stock, and lives caused by farm fires. In many instances fires have the same origin as shock. From a ten-year record of known causes of fires, 313,000 fires started with the electrical wiring of the home. Fires can result when radio antenna is not properly grounded, electric drop cords are hung on nails, bridged electric fuses and fuses of are knotted, electric irons are connected the wrong size are used; when drop cords

and left unattended, electric lamp cords are run under the rug or through a door jamb, light bulbs in exposed places in barns and out-buildings are not protected by glass or metal guards; and when extension cords are used over hooks, nails, and beams, frayed wiring is not repaired, and circuits are overloaded.

Safe Wiring

The practice of safety principles, so far as wiring in the walls of the home are concerned, starts when it is built or remodeled to include electrical service. A set of rules known as the National Electrical Code has been drawn up to be followed in wiring. Regulations of the Code are based on the long-time experience of fire insurance companies, manufacturers of electrical supplies, contractors, and electricians and are a reliable guide in getting a wiring system that will not be a hazard. It is the basis of electrical ordinances in many cities and towns.

Ordinances usually require that a wiring installation be inspected and a certificate issued before the current is turned on by the power company. When electrical work is to be done, whether it is an entire wiring job, additions, alterations or repairs to wiring, it should be understood beforehand that the electrician must arrange for an inspection and produce a certificate of approval covering the completed job.

Every household has a number of flexible cords for connecting portable appli-

ELECTRICITY IN THE HOME has done more to increase our life expectancy than all the wonder drugs. The ironer and 33 cents worth of electricity save seven and a half hours of hard labor for each 100 pounds of clothes ironed. The electric churn and mixer do a fast effortless job, but they are unfair to the kids who used to earn the right to lick the beaters.

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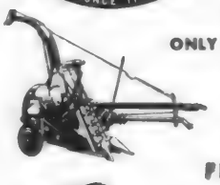

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ances. These cords must stand a great amount of twisting, bending, and kinking without breaking down. Heater cords must take frequent contacts with hot parts of appliances and the braid must resist abrasive wear on the edges of tables and ironing boards. Cords used on portable lamps are apt to be stepped on and abused in other ways.

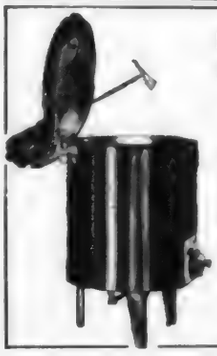
In the first place cords should be used only for the job they are made to do. The Underwriters' Laboratories use four different colored labels to mark the proper use of cords. A yellow label indicates a cord suitable for low-wattage appliances -- lamps, clocks, radios and small motor-driven equipment. A red labeled cord is used on heating appliances and shows that the cord will give satisfactory service for at least 3000 cycles—one "cycle" means the movement of a cord in one typical operation, such as that of an iron back and forth once on the ironing board. A gold label used on heater cords indicates that it will last 10,000 cycles or more. A blue label (shaped like a washer) placed on cord sets shows that the plug and cap as well as the cord have been approved by the UL.

Cords should be watched carefully, kept in good repair, and any repairs necessary should be made at once. Badly worn cord and broken or loose-fitting plugs should be replaced promptly. Improperly spliced cords are not considered safe and should not be used except in emergencies. To prolong the life of cords don't yank them to remove from the socket: the safe way is to grasp the cap firmly and pull.

Temporary extensions should not take the place of permanent wiring in the home. Well planned wiring minimizes the need for extension cords. When they are needed use an extension made from size 16, *HPD Heater Cord* for irons; for lamps, radios, and other low-wattage appliances, use rubber or plastic covered extension cords. Avoid cotton or rayon-covered cords, and use only rubber-covered cords outside and in damp places.

Adequate Wiring

By far the most important single feature in successful electrification on the farm is the wiring system. If electricity is to serve efficiently, this system must be built to accommodate the peak loads, minimize hazards, and make the energy conveniently available at all places where it might be needed.



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Announcing An
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SPRAY PASTEURIZER
25 to 200 Gal. Cap. by
VULCAN HART MFG. CO.
2006 No. Western Pkwy.
Louisville 3, Ky.

The wiring systems for alternating current, furnished by central station power lines, the major source of farm electricity today, are the two-wire system and the three-wire system. The two-wire system brings current into the buildings from the poles outside using only two wires. It offers only 115 volt service and the amount of power available is limited. For this reason it is not recommended for farmstead wiring. The three-wire system brings electricity in on three wires, giving a choice of 115 and 230 volts. Branch circuits may be either two or three-wire circuits.

Wiring installed in each building on the farm follows approximately the same plan. The transformer, which the power company hangs, is usually placed on a pole on the road near the entrance to the farmstead. Wires then run from this source of power to the meter and the main building, where wires enter the buildings.

Al Racke, Persimmon Grove, Kentucky, has been in the wiring business for 30 years. "The main problem with installing a wiring system on the farm," he says, "is that farmers, like everyone else, want the cheapest job possible without regard to possible future expansion of their electrical equipment. They wind up with inadequate wiring and when some high-powered appliance or machine can't be used later, they blame the electrician for a poor job.

"I wouldn't consider a 3-wire No. 6 job today when electricity is a real chore power on the farm," he says. "A farmer with any size farm at all should install at least a 3-wire No. 4 service entrance and a 3-wire No. 2 is still better. There is very little difference in the cost of these larger services as compared to the smaller. About $5 to $7.50 is the difference between a 3-wire No. 6 and a 3-wire No. 4. A 3-wire No. 2 job will run around $75 which is about $25 more than a No. 6 wiring job. The extra service these bigger wires give you, plus the saving in expense and trouble when adding circuits, are worth the added cost."

Three wires, giving a choice of 115 volts for lights and miscellaneous appliances, or 230 volts required for some major equipment, makes an adequate service entrance. The size of wires and the main service entrance equipment fuse box or circuit breaker panel depends on the size in square feet of the home and the amount and type equipment to be used. Considering area alone, if the home has 1000 square feet or less it will need 3 No. 4 wires at the service entrance and either a 60 ampere switch and 60 ampere fuse combination or 70 ampere circuit breaker. If the home has 1000-1500 square feet, 3 No. 4 wires should be installed at the service entrance using either a 100 ampere switch and 70 ampere fuse, or 70 ampere circuit breaker. For a home with 1500-4000 square feet area 3 No. 2 wires will be needed with 100 ampere switch and 100 ampere fuse, or 100 ampere circuit breaker.

The Kinds of Circuits

The general-purpose circuits serve lighting, radio, and small appliances all over the house. There should be one of these 15-ampere circuits for each 500 square feet of floor space or for each group of 10 outlets. They can be identified by the 15-ampere rating on their fuses or circuit breakers in the distribution panel at the service entrance. Nothing larger than a 15-ampere fuse or breaker should be used on such a circuit. One or two extra fuse spaces or circuit breakers should be provided in the distribution panel for possible expansion later. Outlets supplied by these circuit breakers should be divided equally among the circuits.

Appliance circuits service the kitchen, laundry and dining room appliances only. These 20-ampere circuits have larger wires than the general-purpose circuits. At least 2 appliance circuits should be provided in every home and three should be installed in homes larger than 1500 square feet. Appliance circuits are connected to convenience outlets in the walls of the kitchen, laundry, and dining areas only. Not over 10 outlets should be installed on each circuit and overload protection should not be over 20 amperes.

Irrigation News

WEATHER: Made-to-order! FROM ALUMINUM COMPANY OF AMERICA

VOL. 3 No. 4 NATIONAL EDITION • AUTUMN, 1952

SPRINKLER IRRIGATION UPS 23-ACRE POTATO YIELD $1,000

Long Island, N. Y.—Truck Farmer David H. Young reports that a new sprinkler system has increased his profits by more than a thousand dollars . . . *on potatoes alone!* Mr. Young's first experience with sprinkler irrigation came two years ago with the purchase of 1,200 feet of 4" Alcoa Aluminum Pipe and the results were so gratifying that an additional 1,000 feet were added to the system just last year.

In a recent letter to Alcoa, Mr. Young expressed the feeling that its weight alone made Alcoa Aluminum Pipe a "heaven-sent blessing". Much of the back-breaking labor required to move other types of pipe is eliminated with aluminum pipe from Alcoa.

Are Smaller Farms Suitable For Sprinkler Irrigation?

Often asked by operators of medium-sized and smaller farms, "would it be profitable for us to irrigate?" Mr. Young's case is the answer to that. His is a farm of approximately 40 acres . . . potatoes being the largest of his crops. In addition, however, he also raises cauliflower, lima beans, strawberries and blueberries—and he's an enthusiastic backer of sprinkler irrigation.

4" Alcoa Pipe Weighs Less Than a Pound per Foot

Alcoa Aluminum Irrigation Pipe is very light in weight. It is easy for one man to shift two or three 20-foot sections of 4" Alcoa Pipe at a time. The saving in time and effort from using aluminum pipe cuts labor costs, makes irrigation more profitable. Alcoa Irrigation Pipe is available in sizes from 2" to 8" for a wide range of working pressures.

FERTILIZING THROUGH IRRIGATION

You can save time and money by fertilizing and irrigating at the same time with a portable sprinkler system. Liquid fertilizer, containing all the essential elements, is mixed with the irrigation water through a connection at the suction side of the pump. This practice has produced excellent results on crops such as cabbage, cucumbers, greens, sweet corn and fruit.

According to a California conservation engineer, sprinkler irrigation operates efficiently on grades as steep as 30%

By turning on sprinkler systems when air temperature drops to freezing, growers have saved fruit from frost damage.

Since Alcoa Aluminum Pipe is so smooth inside, water flows through it with little resistance—requires less pumping power

Mail coupon for your free copy of Alcoa's 32-page "Pipelines to Profit" book full of useful facts on sprinkler irrigation.

When you buy portable irrigation pipe, look for the blue and yellow Alcoa label.

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Please send me "Portable Sprinkler Pipelines to Profit."

Name.....

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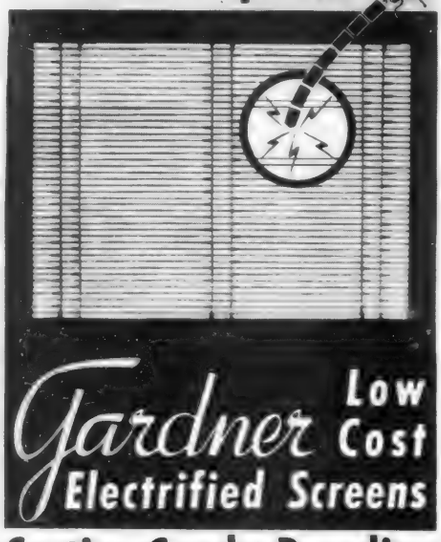
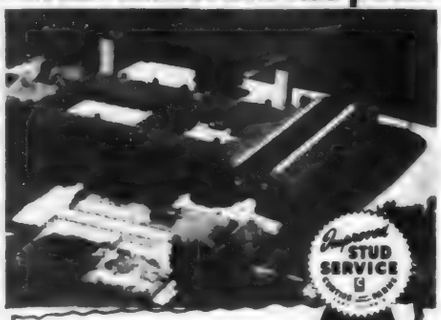
The Safest and best all-season protection against flies and insect pests



Gardner Low Cost Electrified Screens

Curtiss Candy Breeding Farms illustrate the point



Curtiss IMproved Stud Service

The home of the foundation herds of Holstein, Guernsey, Brown Swiss, Ayrshires, Jersey, Milking Shorthorns, Aberdeen-Angus, and Scotch Shorthorns producing the sires used in the nation-wide IMproved stud service.

Cary, Illinois

BY PLACING Gardner electrified screens over strategic windows and on entrance doors, pesky flies that bedevil stock and contaminate, can all but be eliminated. These durable screens operate twenty-four hours a day in all kinds of weather for a current cost of a few pennies per month. They will deliver years of safe, trouble-free service. Curtiss Candy Breeding Farms, along with many other outstanding establishments, have been Gardner equipped since 1943 without any replacement required. Initial cost is comparable to what you would spend in one year to combat flies by other methods. Gardner engineers will gladly prepare recommendations for your needs — without obligation. Write today for full information.

Gardner Manufacturing Co.
3652 Barstow St., Horicon, Wis.

Individual circuits are the "private lines" of the system. Each services one major appliance which requires more power than other equipment. Their capacity varies with the equipment each serves. Each of these pieces of equipment requires an individual circuit when installed: range, fuel-fired heating equipment, dishwasher and waste disposer, automatic washer, clothes drier, attic fan, air cooling unit, home freezer, water pump, bathroom heater, and water heater. All permanently connected motors of ⅓ horsepower or larger require a separate circuit. Motors of ½ horsepower up should operate on 230 volts.

Switches

"People are interested in economizing, of course, but they should be more conscious of what real economy is and what constitutes false economy," says electrician Herb Williams of Newtonville, Ohio. "One way people try to save on wiring is by the number of switches they install. Instead of having the kitchen sink light controlled by a wall switch, for instance, they omit it and put in a pull chain over the sink. The switch would be about $5.00 more. The danger of having a chain within reach of water makes it no economy at all," Williams says.

"When I ask people if they want regular or three-way switches they usually take the regular type. At the time it saves money, but they don't see what will happen," he says with a smile. "At night they start up the stairs to bed, turning on the stair light at the bottom to light the way. When they get to the top they realize they can't turn it off without going down again and coming up in the dark, so they reach up and unscrew the light bulb. Next morning they have no use for a stair light, so forget all about it until they start upstairs after dark and flip the switch at the bottom. No light. Then they remember unscrewing the bulb and have to grope their way up in the dark."

Cost of the Wiring System

What will an adequate wiring job cost? There again several factors are involved. If you install adequate wiring to do the job now and meet future needs too, a few dollars more must be spent today. If you install a minimum system at present hoping to economize, it will cost much more later. Electricians and contractors usually install a wiring system on one or two bases—so much for the overall job, including everything but the fixtures, or so much per outlet. Actually the contractor or electrician, even when charging by the job, figures the cost per outlet, then submits his bid. Today a wiring job will run about $5 per outlet for ordinary outlets. Special outlets, required by such appliances as the electric range and water heater, are more because special wire is used. A water heater, if operating on an off-peak load, must have a special line from the meter pole and an individual

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among horses, mules, cattle, sheep and dogs call for treatment with SPOHN'S COMPOUND. A stimulating expectorant. Acts on throat and bronchial tubes to hasten relief. Used by world-famous horsemen for 55 years. At drug stores, or direct, postage paid—75c and $1.50. Spohn Medical Co., Box 14, Goshen, Ind.

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Purina Research Herd, **where milk production per cow was increased an average of 760 lbs. milk per cow per year for 5 years.**

Chances are you can

STEP UP PRODUCTION 1,000 LBS. PER COW

next year without any change in breeding

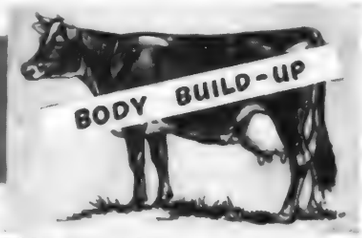
PURINA RESEARCH FARM RECORDS SHOW YOU WHY

Of course we're for good breeding. The better it is, the higher will be the milking capacity of your herd. But our Research Farm and field studies show that most herds today are not giving nearly all the milk they are bred to produce. This applies to top purebred herds as well as most grade herds.

At our own farm we increased production by 760 lbs. milk per cow per year for 5 years. One year the increase was well over 1,000 lbs. And we never bought a female or a proven bull. We simply bought good, though poorly fed, Holstein cows. Then we put them on a feeding plan to *get out all the milk bred into them.* Heifers, when they came along, were better than their dams at the same age, and that continued the upswing.

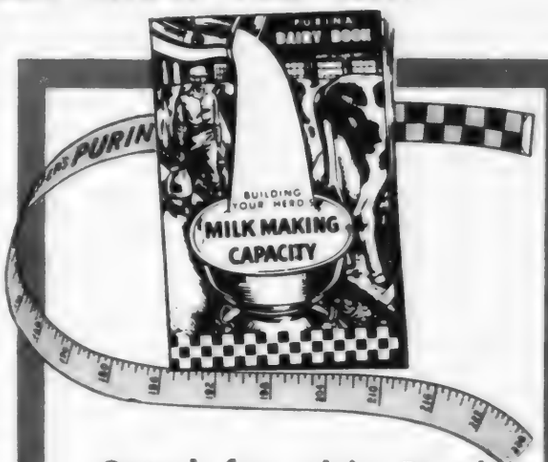
Thousands of our customers—many of them the top-producing herds in the country—have increased production of their own herds by going on the Purina Dairy Plan. Chances are, your herd will also show a response, if you'll take on the Plan in earnest and give it a thorough test. Why not ask your Purina Dealer or Salesman to talk it over with you? Or write for our 64-page booklet outlining the Purina Plan. A coupon is printed here for your convenience. Better tear it out — before it slips your mind.

CONDITION **is the key to production build-up. This takes good feeding of dry cows as well as the milking herd.**



BODY BUILD-UP **is a gradual process. It takes weeks to build *inside* condition before it begins to show in more milk.**

PURINA BALANCED FEEDING DOES MAKE A DIFFERENCE



Send for this Book and Weight Tape

The 64-page booklet gives the Purina Plan for herd build-up. It's *free*. The tape gives surprisingly accurate *weights* by *measuring* heart girth. It's only 20¢. Won't you send the coupon today for either one, or both if you like?

RALSTON PURINA COMPANY
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.....Please mail free Purina Dairy Book D3200.

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I have (or manage) ..... *Milking Cows*

Science in the Barnyard

By DR. HESS

Be sure laying houses are properly ventilated before you bring in pullets. For coryza (the common cold) thrives among chickens housed in damp, drafty quarters . . . causing laying slumps, death losses, and worthless culls. But even the best ventilation won't stop occasional outbreaks of coryza. That's why more and more poultrymen call for Dr. Hess Coryza Tablets. Used in drinking water, this Dr. Hess sulfathiazole product keeps coryza well in hand. *Write for free plans on Poultry House Ventilation.*

Over 5 years ago our research men first worked with nitro-fura-zone for "coxy" of chicks. It was soon found to be active against Salmonella organisms, which naturally raised the question: "How about nitro-fura-zone for necro (caused by Salmonella) of swine?" More than 2 years of research with hundreds of pigs proved it both effective and economical. So, we now offer you Necrono . . . a new Dr. Hess product that's easily used to prevent costly pig losses. Ask your Dr. Hess dealer. *Or write us for new Necrono folder.*

Getting back to the subject of readying laying houses . . . getting rid of mites is mighty important too. Otherwise, these pests often get so bad they kill roosting birds! Mites multiply extra-fast during the dog days and through early fall. They die fast though, once you use Dr. Hess Dip and Disinfectant. That also holds good for any germs that lurk in the poultry house. Just clean it well, then spray with Dip. Get this all-purpose disinfectant from your Dr. Hess dealer.

Worms "come of age" lots quicker in hot weather—and pastured sheep usually pick up lots more of them. Sheep specialists advise keeping a phenothiazine-salt mixture in self-feeders. This kills worm eggs in the manure and prevents re-infestation of grazing animals. Dr. Hess PTZ Pasture Mix does this job . . . and more. Besides the worm-control and salt, it provides essential minerals lacking in dry or woody grasses. *Ask for informative folder on PTZ For Worm Control.*

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Ashland, Ohio
Scientific *Farm-aceuticals* Since 1893

Girls, why don't you try Dr. Hess Coryza Tablets? They knocked my cold in a hurry!

meter. If the meter is on the house instead of a pole, the water heater wiring is from the day meter to the time clock to the off peak meter. A range usually takes a 3-wire No. 6 circuit. The cost of this circuit varies, depending on whether the house is new or remodeled, but often costs as little as $35.

An electrician must include in his overall bid the charge for inspection. In the area in which Williams works an inspector is sent out from the Inspection Bureau, Inc. So much a circuit must be paid to have the job checked. It costs $3 for the first circuit, 50 cents for each additional circuit, $1 for the water heater circuit, and $1 for the range circuit. There are extra charges if the job is over 10 miles from the inspector's office and if he must make a second call for any reason. If the job is approved, a certificate is made out to that effect.

"When I can show that certificate to the customer," Williams says, "I feel I can hand over my bill along with it."

Economy

Loss of energy through too small wires is, of course, the major factor in an uneconomical system. There are others which are not so obvious. For instance, blackened electric light bulbs burn 20 per cent less efficiently than new ones. Near the end of a 60 watt bulb's life, money is saved if the bulb is replaced. Letting electrical lighting fixtures get dusty means wasted electricity, too. Dusty fixtures absorb as much as one-fourth of the light.

Like Topsy, the use of electricity on American farms "just grew" until now over 98 per cent of the rural population in some states is benefiting from the money and labor saved. An understanding of the safe, efficient, and economical use of electrical energy can mean even better living for today's farm family.

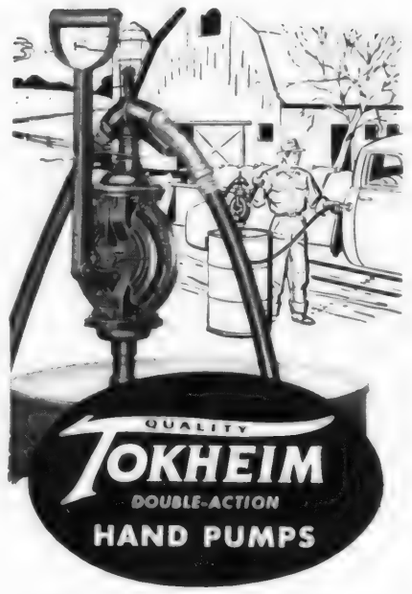
HOMEMADE CHEESE

(*Continued from page* 83)

of sugar corn here in the Miami River Valley—usually can profit more from cheesemaking than people who are dairying and have all their milk contracted for. Of course, during the surplus milk seasons, almost everyone has enough extra milk which could be used for cheese."

Like all cheesemakers, Mrs. Baer has adapted her recipe to suit her own taste and making situation. "Regardless of recipes, though," she says, "the main thing to remember in cheesemaking, just as in handling any dairy product, is cleanliness. To have a really first class cheese, no matter what kind it may be, you have to start with good clean milk. A second point I always keep in mind is to work rapidly with milk before it has a chance to develop a bit more acidity than is necessary to make your cheese. Cottage cheese may be made with sour milk, but it needn't have a sour, bitter flavor."

"I set whole sweet milk aside to clab-



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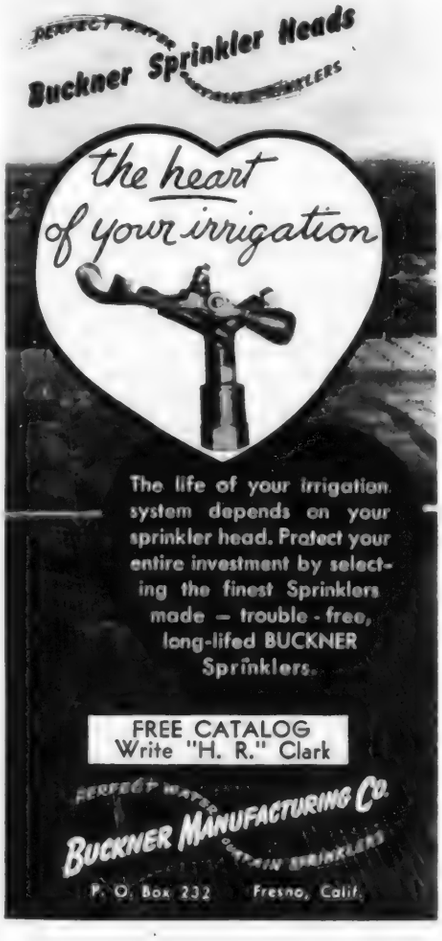
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CERTAIN SPRINKLERS
the heart of your irrigation
The life of your irrigation system depends on your sprinkler head. Protect your entire investment by selecting the finest Sprinklers made — trouble-free, long-lifed BUCKNER Sprinklers.
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Make Every Acre Pay Double Profit

Get Back $12 or More for Every $1 You Spend on Fertilizer!

There's just one way to be sure you're getting the greatest benefit out of the fertilizer you buy—and that's to test the soil. You know exactly what each field needs, and get back up to 12 times what you spend, in greater yields.

You also save up to $15 an acre on lime and fertilizer, by not applying where not needed. Too much of the wrong kind can do more harm than good! An Illinois farmer saved $550 by **not using** the 235 tons of lime he planned to use. Then he made that money do double duty because it paid for the phosphate his soil tests indicated was needed.

Tests Earned $110 More an Acre

Your fall plantings will pay handsome added profits, if you test the soil. This Missouri farmer found he needed phosphate that cost only $15 an acre, yet got back from every acre an EXTRA $125 worth of wheat, lespedeza and hay. Left hand above shows poor stand on an untreated plot. You can have gains like that. It's not too late—test now!

Fall Is the Most Profitable Time To Test Your Soil

This is the best time to find out what your soil needs, to give you top yield in every field. See just what this year's crops took out of the soil, so you can put it back. Know in advance the right kinds and amounts of fertilizer to buy this winter and next spring. Soil tests cost you only 3c an acre, yet give you bigger and better crops, save money on fertilizer. At the same time they build up soil fertility for years to come, rather than draining its vitality.

There's still plenty of time to fertilize fall plantings. Experiment station tests prove it's highly profitable even to test and fertilize meadows and pastures.

Soil Testing Can Double Your Yield

The double yield in bin at right shows the gain from testing soil and using the right amounts of fertilizer. Other bins were grown on plots only partially treated. You can grow 100 to 150 bushels of corn an acre, even up to a record 225!

Owners Enthusiastic -- Over 300,000 Now in Use!

"Your Soil Test Kit terrific! In only one application saved five times the value of the kit." —A. F. S., N. Y.

"10,000 tomato, pepper and vegetable plants turned yellow and grew only 4 in. high. With Soil Test Kit, found soil deficient in nitrogen and now have wonderful plants."—R. D. C., Pa.

"Like it very much due to simplicity and accuracy . . . worth 1,000 times its cost on my 320 acre farm."—G. H., Ohio

"Boosted corn yield 300%, oats 500%, wheat 100% and hay 300%."—H. C. B., Ohio

"Soil Test Kit indicated phosphate and potash deficiency . . . increased yield of beans this year by 50%."—A. F. B., Iowa

"Very pleased . . . best buy I ever made . . . has paid for itself over and over. Last year grew finest corn ever."—W. L. D., Pa.

Dealers—Serve your customers with this essential aid to better farming.

No Knowledge of Chemistry Needed

The simple Sudbury Soil Test takes only 10 minutes, costs only 10c. It eliminates the guesswork—tells you more about your soil than a lifetime of farming. Even your very first tests will be accurate and dependable!

Easy As Reading a Thermometer

It's the easiest way to test your soil. You get your answer right away when you make the test—there's no waiting for reports. Test whenever and wherever you like, even right out in the field—you'll use your Sudbury Soil Test Kit every season of the year, as long as you live.

Our *Daring* Guarantee

Whether farming is your business or hobby, you want to increase your yield. Enthusiastic users all over the U. S. A. tell of huge crop increases and big savings on fertilizer. That's why we dare to guarantee to refund the FULL purchase price within one year if you don't get bigger and better crops with your Sudbury Soil Test Kit! You be the judge, we know you'll never part with it.

Easy Payment Plan if preferred—you can let your Soil Test Kit pay for itself as you use it—see coupon below.

Sudbury Soil Test Kits

Everything for Hundreds of Tests

FARMER'S SUPER DeLUXE MODEL—So simple anyone can use it — so reliable that county agents, ag. colleges, extension workers, and progressive farmers everywhere depend on it. Shows how much nitrogen, phosphate and potash to put on each field. Tells whether lime is needed (pH) and how much. Charts show 225 crops. Comes in lifetime welded steel chest. Directions included. Inexpensive refill solutions always available. A handsome gift for Christmas, birthday, etc. **Only $29.95**

Send No Money

Order your Sudbury Soil Test Kit today C.O.D. plus postage (or send check and we'll mail prepaid, saving you 18 lbs. postage; we'll also include valuable 64-page book FREE "Our Land and Its Care").

If not delighted, return in ten days for FULL REFUND.

FREE TRIAL Send Today!

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World's Largest Makers of Soil Testing Equipment

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Send the Farmer's Super DeLuxe Soil Test Kit at the low cash price of only $29.95 as checked below:

☐ Enclosed is $29.95. Ship prepaid and include copy of "Our Land and Its Care" FREE.

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R.D. or St. .....

P. O. Zone .... State .....

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ber," Mrs. Baer says. "When the cream rises away from the milk, I take it off for butter making, leaving the skim-milk clabber for making the cheese."

"When the curd pulls away slightly from the side of the pan without breaking, it is firm enough to heat. I can tell, too," she says, "if it has clabbered enough by cutting through it with a spoon. If it stays in good firm pieces instead of breaking down in a soft mass, it is ready."

The curd is broken up while it heats and should be stirred constantly. Allowing it to settle causes the pieces to be leathery or stringy. "After making cottage cheese for awhile you can judge when it's been heated enough without using a thermometer. I have never used one because I believe that a thermometer isn't as essential for making this cheese as it is for others in which a few degrees means an entirely different type of cheese. I usually remove the pan from the heat when the pieces of curd are about the size of my finger tip, don't show whey inside when broken, and are tender and creamy in texture," Mrs. Baer says. "If you want a drier curd," she adds, "leave it on the fire a little longer.

"Instead of using a cloth to drain the whey from the curd, I simply pour curd and whey directly from the pan into my kitchen sieve. I found that more whey drained this way and that it was a much cleaner process. For a mild, sweet cheese, drain the curd as much as possible."

After draining the curd, salt may be added to taste. Mrs. Baer has never salted her cheese because some of her customers wanted a sweet cheese to eat with honey or syrup. She found, too, that salting the curd seemed to bring more whey out causing the cheese to become sour sooner.

The curd is stored in earthen crocks in the refrigerator. Occasionally she stirs through the cheese carefully to mix the curd so that the top curd doesn't become dry. Heavy cream is added when the cheese is ready to serve or sell.

"There are more uses for cottage cheese than people think," Mrs. Baer says. "When put through my Foley food mill it makes a fine baker's cheese for cheese cake and pie and a good cream cheese for spreads. The texture and flavor, after it has been pulverized is little different from the cream cheese you buy at the store.

"A cheese dip for potato chips may be made by blending 2 cups milled cheese, the juice of one onion, 1 teaspoon Worchestershire sauce, salt, and cream to the desired consistency. The dip should be slightly thinner for potato chips than for spreading on crackers. A second recipe which is good with crackers may be made by adding catsup and chili sauce to taste to the first recipe."

Making Neufchatel

"Like most farm and ranch families who keep a cow or more," says Mrs. Elizabeth Kuphaldt of Alpine, California, "we found that at times during the year we had more milk than we knew what to do

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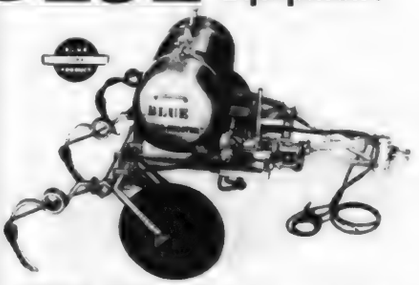

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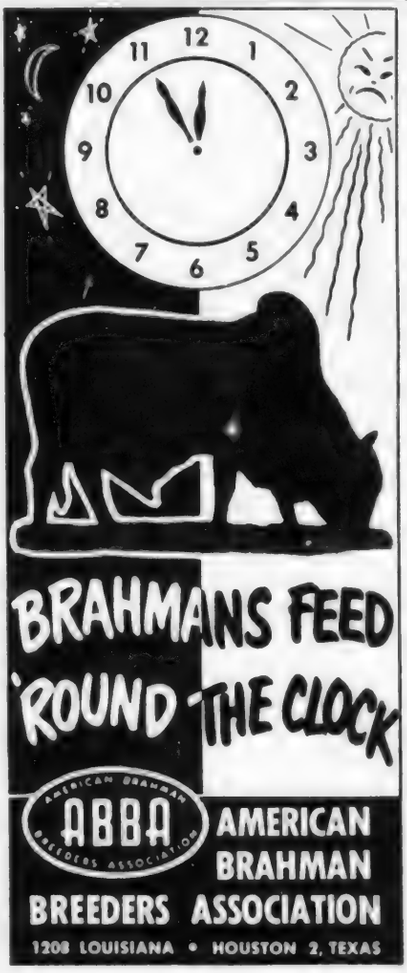

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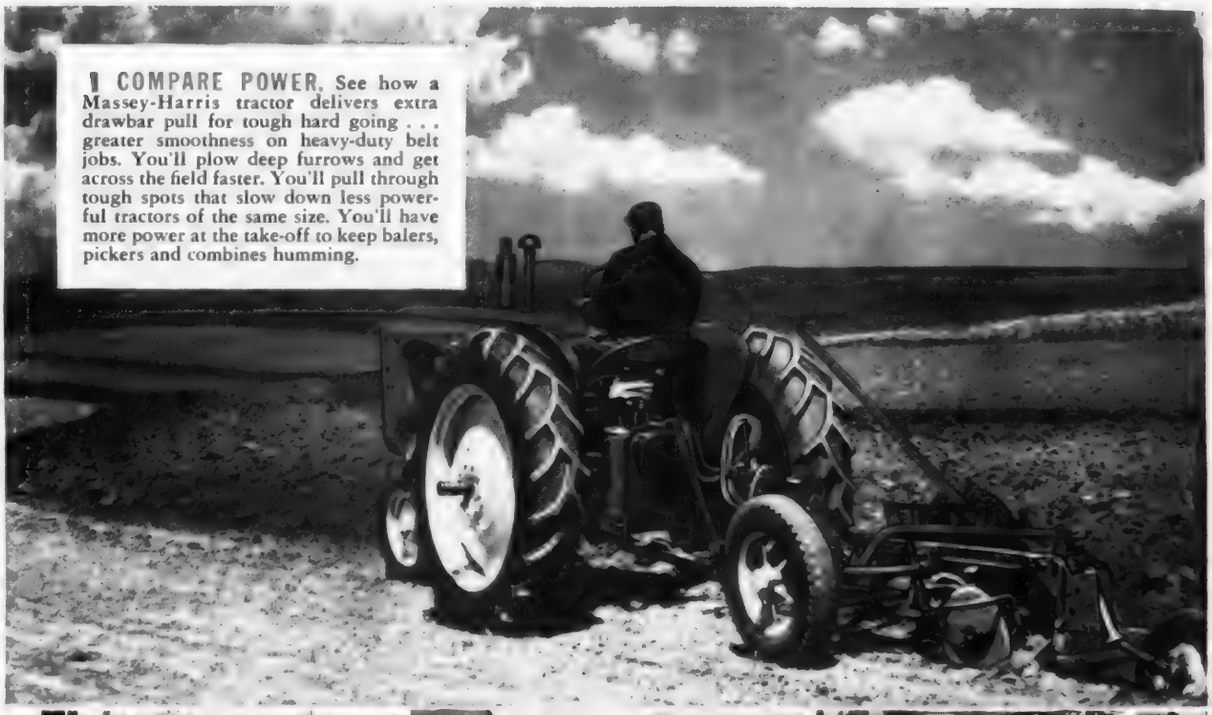

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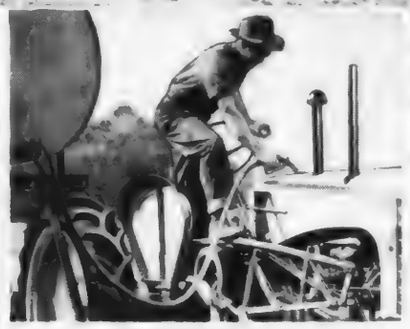

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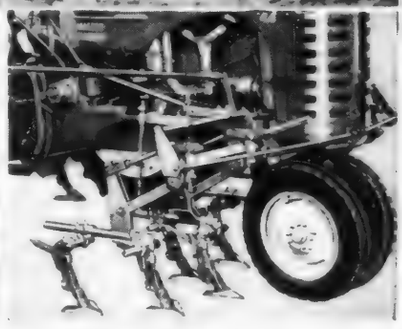

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with. Before the price of calves went up we bought one or two from the dairies around the county and raised them on the surplus milk. After that our skimmed milk went to the chickens, hogs, cats, dogs, and anything else we could find to eat it. That is, until I discovered a real gold mine in home made cheese."

Nowadays extra skim milk goes into cottage cheese and with spare whole milk Mrs. Kuphaldt makes Neufchatel, a Philadelphia-type cream cheese, and Monterey cheese. "And if I make more than the family needs, I find a ready market for home-made cheese among friends and through clubs and churches. Prettily wrapped, a nice round cheese makes an elegant gift or prize," she says.

Five quarts of whole sweet milk, ⅛ cheese rennet tablet dissolved in ⅓ cup cold water, salt, and a clean muslin cloth are all this California ranch wife needs to turn out three pounds of Neufchatel cheese. This is her method:

With the milk at about 72° F. thoroughly mix the dissolved rennet with the milk.

Cover the milk with a clean cloth and let stand from 14-18 hours.

The curd is firm enough if it breaks away cleanly from the side of the pan when pressed with the back of the hand. A little clear whey on top is also a good indication that the curd is ready.

Dip the curd when firm into the muslin cloth and hang up to drain in a cool place for about 24 hours.

The cheese may be used after draining without pressing. If a firmer cheese is desired, the curd may be lightly pressed while still in the drain cloth.

Salt to taste. The cheese should be stored in the refrigerator, where it will keep for a week or two, and should be eaten while fresh. Mrs. Kuphaldt uses it plain or varies it by adding crushed pineapple, chopped nuts, olives or pimento to taste.

American Type Cheese

Mrs. Marie Rich of Kenton County, Kentucky, started making an American type cheese several years ago when it was a part of the home demonstration program in her county. "I discovered early in the process that to make hard cheese right you should use a thermometer and watch temperatures carefully," Mrs. Rich says. "And you can't expect to be a first class cheese maker the very first try, either," she adds. "It takes a few batches to learn the process thoroughly, how to adapt the recipe to your own situation, and to recognize just what's supposed to be taking place at each step. But after a try or two, I came out with the nicest yellow cheese that tasted just like the Longhorn-type American cheese you buy at the grocery store."

To make 6-7 pound of cheese, Mrs. Rich saved back 4 gallons of night milk, stored it in the cooler, and mixed it with 4 gallons of morning milk. Just to be sure of a more uniform milk she added a pint

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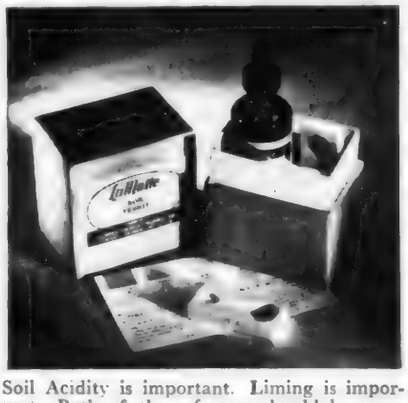

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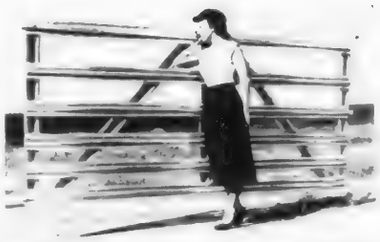

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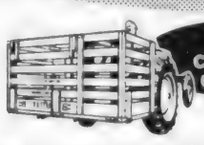

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of clean-tasting buttermilk as a starter. She varied the amount of color used each time so that her cheese ranged from pale yellow to almost orange.

To the 8 gallons of milk, add 1 cheese rennet tablet dissolved in a pint of cold water, stirring thoroughly. Allow the milk to set undisturbed for ½ hour.

Cut the curd when firm in ½-inch squares. "We tried cutting with kitchen knives for awhile," Mrs. Rich says, "but that was slower than we wanted. We fixed a piece of chicken wire, with 1-inch square mesh, to fit the pan. It cut the whole pan of curd in two movements and gave us nice uniform pieces."

Stir the curd gently by hand 15 minutes until the whey starts separating.

Turn the heat on low and raise the temperature to about 102° F. in one hour. The curd should hold its shape by this time and fall apart readily when picked up in the hand and held for a few minutes without squeezing. If it does not, continue heating slowly until it does.

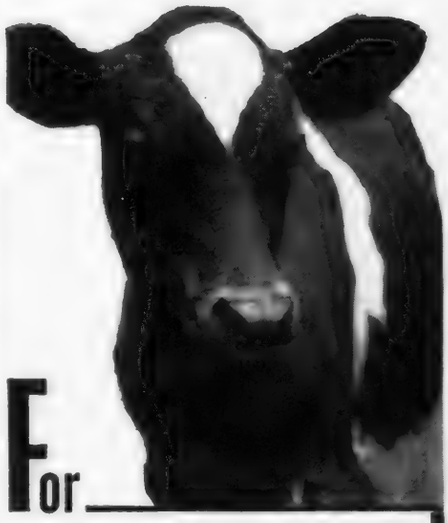
Take the pan from the heat and stir every 5 or 10 minutes to keep the curd from matting together. Leave the curd in the warm whey until it is firm enough so that the pieces fall apart easily when pressed gently in the hand. This will take about an hour. "At this time," says Mrs. Rich, "the curd always tastes a little sweet, if it has any taste at all, and has a slightly spongy, tender texture. Failing to stir the curd constantly while it is heating, or to let the temperature get too high gave us a hard, tough, rubbery curd which would not press properly."

Drain the curd and sprinkle with salt.

Put the curd in the hoop and press. "A gallon syrup can always did very well for a form," Mrs. Rich says, "and my lard press doubled as a cheese press nicely. The top of the press exactly fitted the diameter of the can, so a follower wasn't necessary. One friend wanted small cheeses so she used a little can and pressed the cheese by hand with her old fashioned wooden potato masher. She had the nicest, firmest little cheeses. We pressed the curd until as much whey as possible was out and until the cracks in the sides of the cheese were closed. Cracks should be avoided because any mold that forms on the outside of the cheese can get inside too easily and cannot be cleaned properly."

After drying for a day or two, the cheese should be dipped in paraffin and put away in a moderately warm, humid storage to cure for 3 weeks or more.

The cheddaring process used in factory made American cheese is not suitable to most small scale production methods and usually is modified in home recipes. To "cheddar" the cheese the whey is drained from the cheese vat after heating the curd and the pieces of curd are allowed to mat together. When matted the curd is cut into large pieces about the size of a long loaf of sandwich bread and turned to help the whey escape. Then the loaves of curd are stacked, first two high, then three high,



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then four high. More whey escapes each time the pieces of curd are stacked and the piles mat together, becoming smooth and velvety in texture. These large pieces of curd are then put through a milling machine which cuts them into small pieces. This curd is salted, hooped and pressed just as in making uncheddared cheese.

Swiss Brick Cheese

Cheesemaking on the farm, small scale or large, can come under the heading of Profitable Business. If you stop by the Alpine View Farms in Tuscarawas County, Ohio, on a Sunday afternoon, John Stotzer himself probably will be there to show you around his farm and to explain about the huge Swiss bells worn by his Holstein herd through the spring and summer.

"An old saying goes," he may tell you with a smile as you sample his cheese, "that cheese eaten in the morning is like gold, like silver at noon, and like lead at night." It could be added that cheese also means silver in his pocket.

A native of Canton Berne, the dairying region of Switzerland, John Stotzer came to this country when he was 17. His main farm income until about 1938 was from milk and Holstein stock. Then he decided on a more profitable angle of the dairying business, built a cheese house, and started his own retailing by turning his milk into cheese—30,000 pounds of it a year.

The cheese formula he uses for his Swiss Brick cheese is a secret one passed on to him by an old Swiss cheesemaker. Generally, the evening milk is cooled and added to the morning's milk for the process. The milk is poured into a 300-gallon copper kettle made over 100 years ago when kettles were hung over an open fire for cheesemaking. It has since had a steam jacket built around it.

With the milk at about 86° F., according to the old Swiss thermometer he uses, he adds starter, usually a bucket of whey from the previous day's cheesemaking, and just a trace of color. Enough rennet extract is used to set the daily batch of 1600-1800 pounds of milk in ½ hour. When the curd is firm enough he "harps" it with a Swiss cheese harp into pieces about 1-inch square. He lets it stand a few minutes, then stirs it gently before turning on the steam. The curd is heated to approximately 100°-102° F. and the steam turned off. An automatic agitator keeps the curd constantly moving while the heat is on.

The curd is judged ready when it has a tender, spongy texture and is almost tasteless. The whey is pumped immediately from the kettle through a separator where any cream present in the whey is taken out. The whey itself is fed to the hogs. The curd, enough for about 16 bricks of cheese, is scooped out of the kettle into heavy wooden rectangular forms which are on a wooden draining rack. After the curd drains and settles, a wooden follower is put on top of each cheese and weighted with a brick. The cheese is turned twice during the day.

After draining and pressing, the cheese

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is floated in a brine tank for 24 hours. The heavy brine solution salts the cheese and helps form a rind which protects it from mold. Then it is placed on the curing room shelves to dry. When any mold forms on the outside of the cheese it is washed off with mild salt water. After three weeks of curing it is dipped in paraffine, then left to cure another week before it is ready to be sold. At this time it has a waxy, creamy texture and a trace of sharpness in the flavor. The cut surface shows a few small mechanical holes, caused by some pieces of curd not pressing firmly together.

The cheese sells for 65 cents a pound in the brick, which averages 6-7 pounds each, and for 70 cents a pound in the cut brick. Much of it is bought right on the farm by people who stop to see the cheese-making operations and to hear the Swiss bells as the Holsteins graze over the hills. The rest of it is wrapped in parchment paper and mailed to customers from Maine to California who, like Ben Gunn, from time to time enjoy good cheese.

GRADE A MILKHOUSE

(*Continued from page* 49)

if the owner did the work, and close to $1,800 if it is contracted out. To this will have to be added the cost of the cooler, wash tanks, racks, hot-water heater and house-heating equipment. These will vary with the ideas of the dairyman. In any case, it will be roughly $500 more for this working equipment in a small milkhouse.

Now suppose we jump a few months, past the headaches of keeping workmen on the job and building material shortages, to the day when all the electrical and plumbing connections are made and the milk is brought in to cool in the new milkhouse for the first time. How do we make our investment pay off in bigger milk checks for the farm? A Grade A milkhouse won't produce more milk; only the cows can do this. But it will help prevent rejection of milk for off-flavor, odor and high bacteria count.

What is Grade A Milk?

Back in 1923 the U. S. Public Health Service developed a standard milk ordinance and code with the cooperation of the states, cities and dairy industry. This defined Grade A raw milk in specific and scientific terms. The present code (in its 8th revision) reads, in part, "Grade A raw milk is raw milk the average bacteria plate count of which does not exceed 50,000 per cubic centimeter, or the average reduction time of which is not less than 8 hours." For milk that is to be pasteurized the code reads, "the limits shall be 200,000 per c.c. and have a reduction time of not less than 6 hours." The term "reduction time" refers to a test using methylene blue dye. If milk has a high bacteria count it changes

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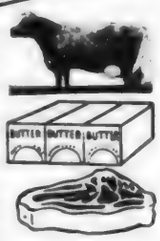

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the color of the dye in a short time. However, the methylene blue test is not too accurate and in many localities it is being discontinued. And, of course, Grade A milk should have no off-flavor or odor.

For several thousand words the code defines the rules for producing clean milk, some of which a dairyman will know: there are others that will amaze him. All of which make it required reading for the dairy farmer who wants to know what is expected of him. The Milk Code is given completely in "Public Health Bulletin No. 220", which is available from the Government Printing Office, Washington, D. C., for 50c. Many states have their own Department of Health circular which gives the Grade A requirements, such as Illinois "Circular No. 135." State ordinances are all based on the government one and should also be used by dairy farmers.

Eliminating the $2.00 words, we can say that Grade A raw milk is milk from disease-free cows which is handled with reasonable care. Reasonable care starts when the dairyman takes his milking machine off the racks in the milkhouse. Care and cleanliness are important at every step along the line until the milking is done, the cans drop into the cooler and the equipment is washed, sterilized and hung up to dry.

Straining Doesn't Improve Milk

The quality of the milk is better when sediment from too much lime on the floors, dusty feeds or dirt is kept out by clean methods of production rather than by straining. Don't sweep during milking time; avoid feeds that are dusty. Strainers should be used only to remove any material that may have fallen accidentally into the milk. Straining milk improves its appearance but not its real quality. Once foreign material has fallen into the milk, the damage has been done. The bacteria have found a happy home, with food wherever they turn.

Single-service cotton pad strainers are best. These pads have to be discarded after each milking or more often if it fills up with sediment. Ordinary cloth should never be used for straining. The metal strainer should be made in such a way that the milk does not hit the disk directly when it is poured into the strainer. This keeps the disk from being dislodged and from being torn apart by the impact of the milk. The strainer should be built so it is easy to disassemble and clean. Inspectors point out that the strainer must be used with the right size pad, and the pad must be inserted so the milk can't get around it, otherwise the whole process is not effective.

Cool it Fast

A Kentucky milk inspector brings a criticism of dairy farmers that is important in the battle with bacteria. He says: "I visit over a hundred dairy farms every three months; only two of the dairymen

know what the temperature of their cooling tank is and how long it takes to bring their milk down to 40 degrees. They own dairy thermometers graduated in one-degree increments and watch their milk-cooling time carefully. If dairy farmers would realize that the addition of an accurate thermometer of the laboratory type —they cost about $2.50—to their milk-house equipment would do for them it would open their eyes. Why, I've seen the core of a ten-gallon can of milk in a cooler stay above 60 degrees for six hours after milking. That means if you've got a bacteria plate count of 20 to 25 thousand at milking time in the evening, you're going to be pushing over the 'out-of-bounds' limit of 200,000 by the next morning. There are four things I tell farmers about cooling: First, don't let the first can stand in the milking room 'til the last cow is stripped out and the milk put in the last can. Get the first can into the milkhouse, strain it and start it cooling as soon as it's full. Second, stir the milk in the cans with a clean milk stirrer three or four times in the first hour; that will keep a hot core in the middle of the can from resisting cooling. Third, keep the water in the milk cooler between 35 and 40 degrees. If you have enough power to build up a three- or four-inch ice bank, you will have the reserve cooling capacity to cool a number of cans in a short time. If you can't cool your milk below 50 degrees in two hours you'd better see what's wrong with your cooler. Fourth, don't add warm milk to a cool can of milk from a previous milking. It's one sure way to build up a bacteria count, in a hurry. Warm and cold milk won't mix and you have the 'warm core' effect again which encourages bacteria growth."

Aerator Cooling

Lyndon Gray, a southern Ohio dairyman, is using an aerator cooler (wall type cooler) to bring his milk down to storage temperature. Cold water from his milk cooler, sometimes called "sweet water," is pumped through tubes of the wall cooler and then circulated back into the tank. The pumping is done with an $8.00 gear pump hooked to a ¼-h.p. motor. He says: "It takes about eight minutes to cool a ten-gallon can of milk. I dump it in the tank above the cooler and let it flow down while I start the washing up. It usually goes in at about 90 degrees and comes out the bottom at 46 or 47 degrees. Then it's put in the milk cooler for storage. I like the way it takes the animal heat out of the milk—in a hurry. We haven't had a single odor or taste report from the dairy since we've cooled it this way. Our bacteria count has been below 5,000 during the summer months too. We had some suggestions from our milk inspector on washing the cooler and sterilizing the tubes with chlorine compound just before use. It's one more piece of equipment to wash up but I think it's worth the trouble."

The Kind of Metal is Important

Before buying new utensils it's a good idea to talk to your milk inspector to be

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sure they are the right type. Dairy utensils, cans and pails should have rounded, smooth surfaces that are easy to keep clean. When utensils have open seams, rough solder or rusty spots that the brush cannot clean, milk settles in them and forms breeding places for millions of bacteria.

The metal of which the utensil is made may cause oxidized, cappy, metallic and other off-flavors to develop. Milk can dissolve copper, iron, steel or zinc, and cause off-flavor. For that reason a dairyman should use well-tinned utensils or stainless steel. Never use utensils made of galvanized metal, zinc, enamel ware, copper or copper alloys. Tinned steel milk pails and cans are all right to use until the tin wears off but they should then be discarded or retinned.

Wash Utensils the Right Way

Important rules for insuring clean utensils are: (1) Immediately after milking, rinse utensils in cold or lukewarm water. Hot water should not be used as it makes the milk stick to the utensils at this stage and causes milkstone. (2) Wash utensils in fresh, hot water—as hot as your hands can stand. Add one level tablespoon of dairy washing powder to each gallon of water. A powder containing a chemical known as a wetting agent is best. Diamond Alkali has an efficient new cleaner known as "Neutral 50" which works well in hard or soft water. Avoid ordinary laundry soap powder as it may not rinse freely and may leave a greasy film. Use a brush in washing because it cleans itself in use and can be kept clean. (3) Rinse off the washing solution with hot water. This is important to help prevent the formation of milkstone. (4) Rinse utensils in hot water. (5) Shake water off utensils. If hot enough, they will dry quickly. (6) Turn all pieces upside down on a clean metal rack so water will drain off.

Of course is is necessary to have a supply of pure water, free from contaminating bacteria. To make sure of this, water samples should be taken from all wells and cisterns from which dairy water is drawn, in accordance with directions provided by the Board of Health inspector.

A utensil may look clean and still not be free from bacteria. To destroy bacteria, heat or chemical sanitizing must be used. Proper heat sanitizing dries the equipment as well as leaving it bacteria-free. Chemical sanitizing costs less and it is easy to use without any special equipment. However, it does not do a good job of killing bacteria unless the surface is absolutely clean. The right time to do chemical sanitizing is just before the equipment is used, so contact with the metal should not be longer than necessary for adequate sanitizing.

The main reason for widespread use of chemical sanitizing is that it can be used by everyone where there may not be equipment for heat sanitizing. Standard

rules for sterilizing as specified by the United States Public Health Service are: (1) exposed for at least 15 minutes at temperature of 170 degrees F. or for at least 5 minutes to 200 degrees F., or higher temperature in a steam cabinet; or (2) exposed to a jet of steam for at least 1 minute; or (3) exposed to a chlorine solution of approved strength (made up at 200 parts of chlorine per million—not used after it falls under 50 p.p.m.) for 2 minutes or more; or (4) immersed in hot water at 170 degrees F. or more for at least 2 minutes.

Killing Bacteria

The old standbys in chemical sanitizers are the chlorine liberating compounds, such as B-K or HTH. They are sure death to bacteria if used after the utensils have had all milk solids removed. They are inexpensive; the directions for B-K call for the use of a tablespoon of the dry powder to 4 gallons of water to make a solution of 50 parts of chlorine to a million parts of water. Since a pound and a half bottle costs about 85c, it is easy to see that this is one of the cheapest supplies a dairyman has to buy.

In the last few years a new kind of "detergent-sanitizer" has come on the market. These combination washing-sterilizing compounds are of the quaternary ammonium type and are sold under such names as "Thermo-San", made by the Tycor Division of the Borden Company, in a liquid form. The detergent-sanitizers produce a suds in warm water like soap and with one operation a dairyman can get the milk, fat, and scum off and at the same time do an effective job of bacteria killing. In field tests, where they have been used for washing in New York State they have reduced bacteria counts on raw milk being shipped as much as 61 per cent. The detergent-sanitizers are viewed with some suspicion by Boards of Health, however, because they do not work well in all types of water; hard water often destroys their bacteria killing action. As one New York dairyman says, "We got good results with our new combination suds-sanitizer wash-up, but our inspector took the 'even if it's good, I don't like it' attitude toward it. It's so new it isn't in the book, and he lives by his book. It saves 10 minutes time in our washing-up. It's easy on the hands and milk cans—doesn't rust nearly as bad as chlorine. We find the cost is lower than the cost of dairy washing powder plus sanitizing compound, the two things it replaces."

Before using any of these new products it's a good idea to check with the milk inspector and see whether it is approved in your area.

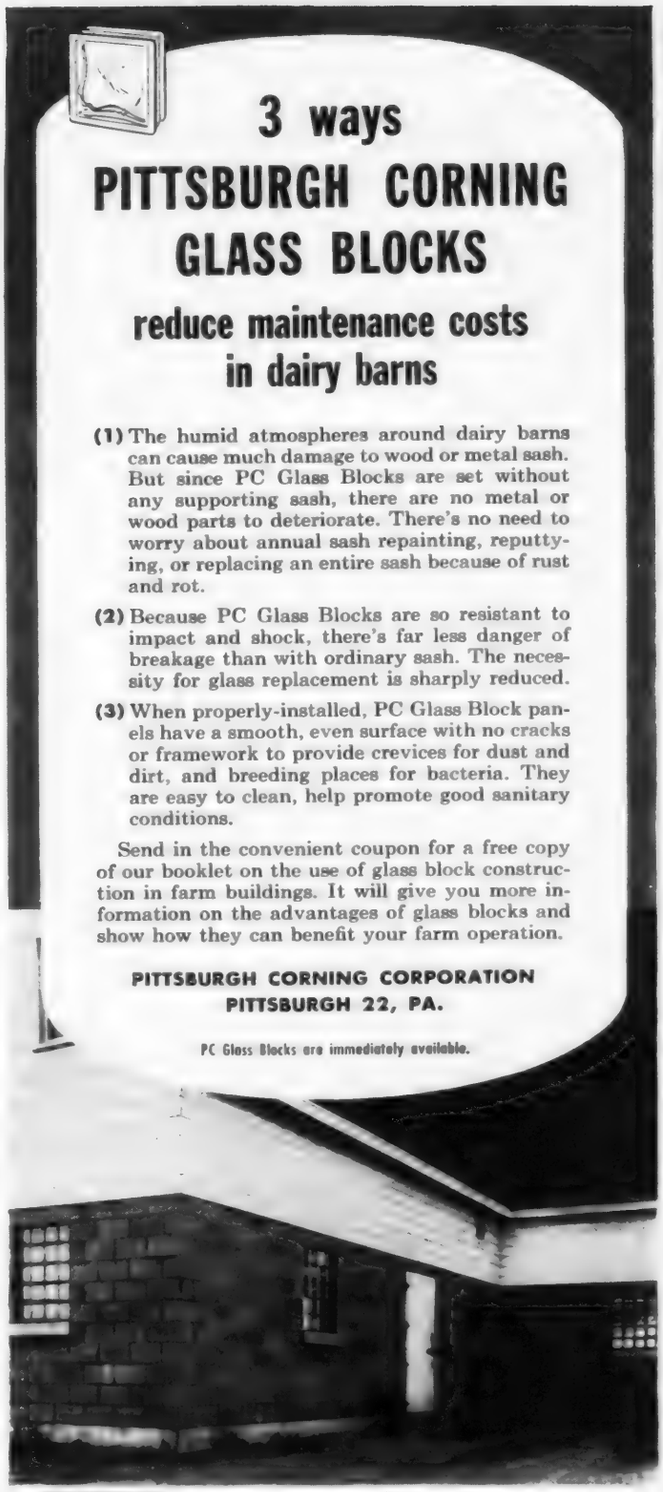
Washing the Octopus

A milking machine needs to be taken apart so that all surfaces that come in contact with milk are brushed in a dairy washing solution after each milking. This is easy to learn to do in less than ten minutes per unit with a modern milking machine. A cleaning rod should be used for the long milk hose.

Applying the same principles as for other dairy utensils, we need to: (1) Rinse the machine by drawing at least two gallons of fresh, clean cold water through each unit immediately after milking before the vacuum pump is shut off. (2) Next, take apart all the milk tubes, teat cup inflations, valves, pail head and pail; then brush with the warm dairy washing solution needed for the other milk utensils. (3) Rinse all parts with clean, warm water to remove the washing solution, and (4) Immerse in hot water.

The teat cup assembly requires further attention between milkings to prevent increase in the number of bacteria. After the washing treatment, put the assembly on a rack and fill it with a ½ per cent lye solution so that all surfaces that touch milk are completely in contact with the solution until the next milking. Just before milking again, the lye solution needs to be discarded and a chlorine solution drawn through the machine.

For some dairymen Grade A milk can be a cross to bear; for others it's a seal of quality. It all depends on how much pride a dairyman takes in his product. Americans are the greatest users of fresh milk and cream in the world (about 180 quarts per person per year), mainly because our milk is safe and is the best combination of food elements available in one "package."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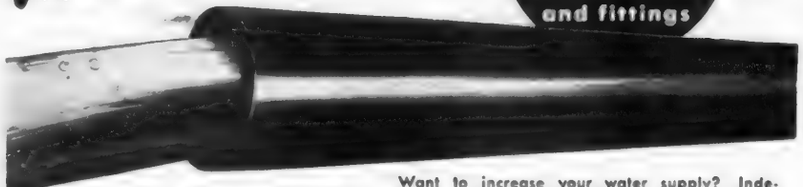

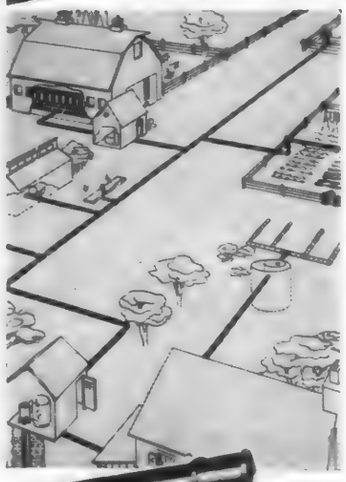

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HUNTERS AND FARMERS

(*Continued from page* 55)

season opening, holiday, or what not, do the farmers allow too many hunters to hunt on their land during any one day. Non-resident hunters in Iowa hunt on the same basis as residents, with non-resident license, of course, and it is comparatively easy for non-resident hunters to get hunting permission. Under this system the increase in small-game supplies and the improvement in farmer-hunter relations has been little short of phenomenal in Iowa.

In 1949 the California legislature passed a bill establishing cooperative hunting areas. Under this law an area must contain at least 5,000 acres in a continuous tract. There is a provision which permits landowners to collect a daily fee not to exceed two dollars per hunter, with the stipulation that 25 per cent of the total collected be used for wildlife maintenance and habitat improvement within the area. The cooperative area contain three types of zones: (1) closed zones for protection of crops, buildings, and livestock on which no hunting is permitted; (2) restricted zones, on which permission to hunt is granted solely by landowners; (3) and open zones, which are open to public hunting by permit. Restricted zones are limited in size to 20 per cent of the total area, while open zones must be either a 5,000-acre tract or 50 per cent of the entire cooperative hunting area, whichever is the larger. The maximum number of hunters allowed at any one time is one per five acres of open land, with the stipulation that this can be decreased if conditions warrant.

Illinois public hunting ground areas, managed by the State Conservation Department, operate like this. The hunter arrives on the area and registers at the checking station, where his permit and license are checked. The hunters are then grouped, and each group is assigned a certain starting point within the area. The hunters each buy a $2.00 "public hunting ground" daily usage stamp (good for one day only) at the checking station, leave their license there for the day or duration of the hunt, and then proceed to their designated starting point after they have been given a lecture on safety and good manners. Area permits are issued for one area only, and a specific kind of hunting, and these too must be left at the checking station along with the license. At the end of the hunt the hunter returns to the checking station, where his kill is inspected, his stamp turned in, and his license given back. Fees collected for daily stamps, of course, go into a fund for the maintenance of such areas. The controlled shooting area plan works very similar to the public hunting grounds plan.

An Indiana truck farmer was being pestered to death by crows. Not being much of a hunter, in desperation he finally sought help from a nearby town gun club. It was good off-season sport for the town

hunters, and they jumped at the chance to help the truck farmer rid his farm of the black pests. Neighboring farmers became interested, and they invited the hunters to shoot crows on their farms also. The final result was, the members of the gun club gained small-game hunting privileges during the season on the farms over which they had shot crows during the off-season, and the farms were closed to all other hunters.

A Georgia farmer was having dove hunter problems. The hunters were trampling down his crops and making general nuisances of themselves. A plan was finally worked out between the farmer and a sportsman's club. The hunters furnished the seed and fertilizer for a large field of millet. The farmer agreed to leave a strip of the millet standing around the edge of the field. The hunters agreed not to shoot doves in any other field on the farmer's place, and to show up in groups not larger than ten for any one day's shooting. That has worked out fine.

A small group of Mississippi farmers worked out a plan with a town sportsman's group. The sportsman's club members agreed to buy farm products, chickens, eggs, vegetables from the cooperating farmers in return for permission to hunt. The farmer gets good prices for his produce; the hunters have exclusive hunting rights on his farm.

Is There a Perfect System?

Any system to work must include some means of paying the farmer for his time in making his farm a suitable wildlife production area, and for his protection against the hazards which always are brought in when a man climbs over the fence into one of his fields.

Most of the control systems now being practiced are based on the assumption that a farmer will voluntarily, and mostly at his own expense, provide cover, feed, water, and protection for wildlife, and then just because he has it, permit it to be killed off by a perfect stranger who comes and asks him for the favor. The further assumption of wildlife experts is that the farmer will do this because what is favorable to wildlife is also favorable to good farming. That is undoubtedly a sound conservation theory; but it's going to take a long educational program to get the average farmer to believe it, and once believing it, to practice it.

He does understand cash in hand; a system which says to the farmer, "You'll get somthing out of this too," will be the system which has the best future. All others are makeshifts, good only until someone fills Daisy's backside with birdshot.

THE AUTHOR: Carlos Vinson has hunted and fished over a good part of the U. S. and for many years he has appreciated the importance of good farmer-hunter relationships. At the present time he lives on a farm near Daylight, Tenn. In compiling the information in this article he had occasion to contact farmers, hunters and conservation officials in most of the 48 states.

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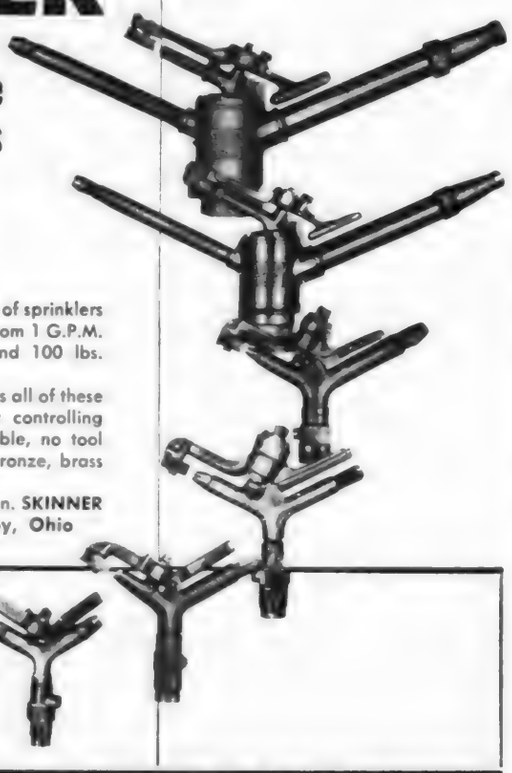

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SEED BED FOR PASTURES

(*Continued from page* 65)

states is Louis Bromfield's Malabar Farm. Malabar is the mecca for thousands who want to learn how to keep their fields green: and the master is generous with his advice. The rolling Ohio hills and contrasting soils make Bromfield's problems different from the Iowa farmer's. But the principles of seedbed preparation are still the same.

For his place and for any spot north of the Ohio River he prefers spring seeding of grasses and legumes. He has been successful in establishing meadows by sowing winter wheat in the fall, then going in and tearing it up with a rotary hoe early in the spring. "Won't hurt the wheat at all," he says. "As a matter of fact, it promotes stooling. After that you just drop your grass and legume seeds on top of the ground and let the rain wash them in." He shuns deep seeding.

His primary preparation is done with a Seaman tiller when he is working on an old sod: if the soil is heavy he follows up with a Graham plow or heavy discing. The results of these two operations are a thoroughly worked, trashy seedbed. Weather permitting, he uses the cultipacker for firming before seeding.

Since Seaman tillers and those big Graham plows that take anything from a three-bottom tractor or larger to handle, are not found on every farm, the question arises as to what Bromfield would do without those implements.

"I'd disc hell out of the field late in August," he answers, "Go over it again and again until I had it in just the shape I want."

If he is not going to sow wheat, Bromfield does a thorough job of tearing up sod in the fall, regardless of slope—and he has some steep ones—lets it stand all winter and seeds in the spring. Before seeding he goes over the field with an offset disc. The trash mulch cuts down the danger of erosion while the fallow period gives the old grass time to break down and return organic matter to the soil.

Here a word of caution is necessary. While this is definitely advantageous on the heavy soils of Malabar, others would be apt to suffer badly from wind and rain. Better have a good idea of how your soil would react before trying it.

Band seeding is a method of seeding grasses and legumes that has been used with much success in Ohio for several years. In band seeding the meadow mixture is drilled at the same time as small grain, dropped on top of the soil and directly over the fertilizer strip.

In seeding with oats the recommended fertilizer application is made for the oats and the fertilizer and oats are run down the same spout of the grain drill. Auxiliary tubes are attached to the short tubes from the clover-grass seed box on the drill and fastened about six inches behind the discs and directly over the fertilizer band. The

oats are drilled to their usual depth, while the clover-grass mixture is dropped right on the surface and no attempt is made to cover the seeds. When the seedling root reaches the fertilizer it gets a tremendous boost of growth.

If the operator prefers, this method can be used without seeding a grain crop. In that case the fertilizer is applied alone through the grain spouts while the seeds are dropped on the surface directly over the band.

On sloping land precautions must be taken to insure that the seed tubes stay directly behind the dics. If they drift down the slope the seed will be dropped to the side of the fertilizer band and the desired results will not be obtained.

The hills of Kentucky present some special problems that are being solved with special methods. Good land use dictates a policy of keeping these hills constantly in grass and the big job here is of renovating old, bushy pastures.

Tom Ford, a Kentuckian, born and raised and now a district supervisor of the Soil Conservation Service, has directed the reclamation of thousands of wornout hillsides. His principal implement—the bush and bog harrow.

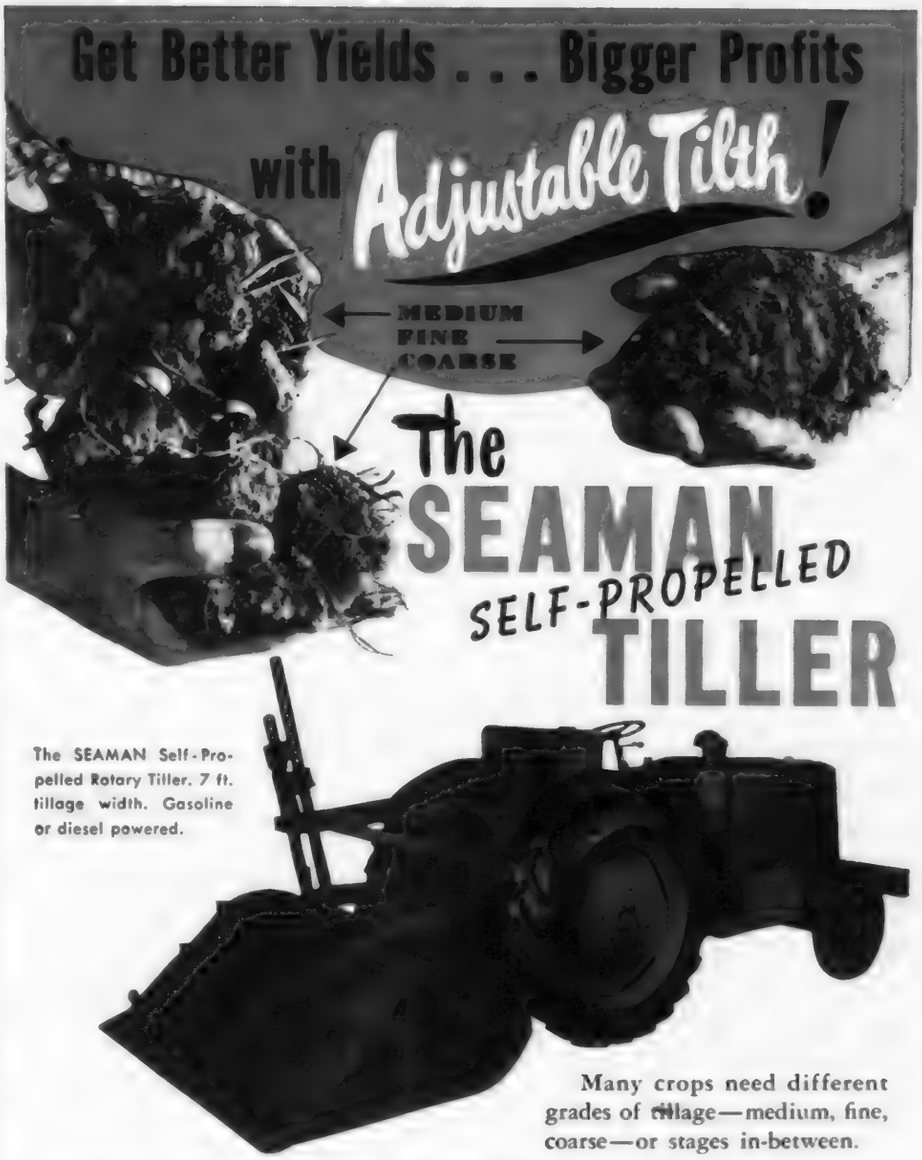
Now a big bush and bog harrow and the powerful track-type tractor it takes to pull it are not ordinary farm implements. However, the demand for this work has been so great that custom operators have been kept constantly on the move with the big equipment. With their full schedules they have been able to keep their rates low.

The bush and bog tears up everything in the field, including trees of several inches in diameter, and leaves a well turned, rough piece of land. The time to start to work is in the dry season, says Ford. "You will get a wider kill of weeds and undesirable vegetation," he says. The soil works better, breaks up, gets more open.

"Leave it rough over the winter. By spring the heavy clay is broken down by freezing to a mellow texture and the ground will store up more rainfall and snow of the winter. And on that point I'll tell you something, too.

"In the spring we've gone on to two facing slopes, steep slopes 28 degrees or better; one had been bog harrowed the summer before and the other was in bluegrass sod. We've taken samples of the soil 36 inches deep, just as deep as our soil augers can go. Under the bluegrass sod the soil was dry at 18 inches. We still had mud at 36 inches under the harrowed land. There was more moisture at 36 inches under the harrowed surface than there was under the sod at 12 inches, and there was no evidence of erosion or runoff.

"Another advantage of letting the land lay over the winter is that the farmer can use his slack time to remove stone and the heavy brush and trash that would be too coarse to be left in the field. Anyhow, it



The SEAMAN Self-Propelled Rotary Tiller. 7 ft. tillage width. Gasoline or diesel powered.

Many crops need different grades of tillage—medium, fine, coarse—or stages in-between.

Various soils need different grades of tillage, too. Colloidal soils that tend to puddle or ball, for example, should not be worked too fine. Many light loams, on the other hand, produce better with high pulverization.

And soils often vary even from field to field.

That's why you may need *adjustable tilth* for maximum yields and that's what the SEAMAN TILLER provides. With quick, easy adjustments the SEAMAN TILLER gives you every degree of tillage from coarse clods (ideal for pasture renovation) right on through to the finest pulverization.

And remember, the SEAMAN also chops, mills and mixes in fertilizers and cover crops more thoroughly than any other farm-scale equipment.

The SEAMAN Heavy Duty Rotary TILLIT. 3 ft. tillage width. Close coupled hook-up to tractor provides short, efficient drive from P.T.O. Operates with tractors as small as 23 H.P. Ideal for small farms (10 or more acres) and for many tillage jobs on large acreage. SEAMAN also builds gasoline or diesel motorized models pulled by medium sized tractors. 6 ft. and 7 ft. tillage widths.

For the *just right tilth*, for greater humus development, for better erosion control — in short, for farming at a top profit — do it with a SEAMAN.

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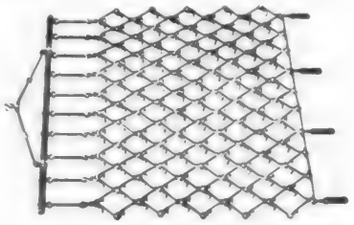

The many separate uses of this English Tine Harrow make it the first choice for grassland farming. Manufactured in England by Homer's . . . the Flexibility of this type harrow allows it to follow the contour of the land . . . distributing fertilizer evenly for more profitable grassland.
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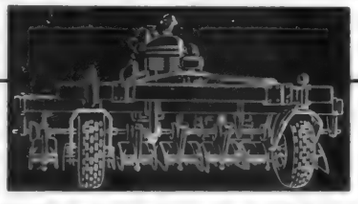

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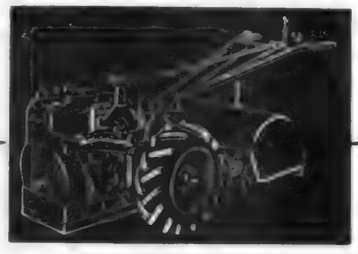

would be impossible to drive a tractor or cultivating equipment over the field until it settled a bit.

"In the spring you disc the field well and cultipack it. And don't tell me you don't have a cultipacker. A cultipacker is one of the most valuable farm implements. It's more fundamental than a plow on this kind of land. Cultipacking gives a definite bond between the seed and the soil and starts the seed off as soon as the temperature is right for germination."

"If you feel you must have a companion crop," he says, "I'd suggest winter wheat spring sown. It won't head and it won't stem. It just throws up leaves which shade the grasses and later form a mulch. Oats are always heading just at the time the grasses need the most moisture."

Ford prefers spring seeding for his territory because of the hazards of drought and winter heaving to which a summer or fall seeding is exposed. There are some lands in his area that are so subject to winter heaving, lands with a high water table or underlaid with hardpan, that deep-rooted crops like alfalfa have decidedly rough going. For such lands an annual like lespedeza or a plant with branching roots like ladino seems better adapted.

In this hill land, pasture is very definitely a valuable crop and should be treated as such. Ford is emphatic about the value of soil analysis and tailored applications of lime and fertilizer.

LAND $30 AN ACRE

(*Continued from page* 34)

will furnish a 16% protein diet. Coastal Bermuda is a hybrid and in contrast to the native Bermuda it grows tall, up to your knees, and it does not grow out flat on the ground and get sodbound. It is pastured from about April 15 until frost, which is usually about November 15 in Georgia. In wet weather it grows fast and gives a field of beautiful blue-green cover. In dry weather in June and July it waits patiently and with every shower it makes a spurt of growth. It is started by chopping up the grass stems into small pieces: these short lengths, called "stolons" are dropped into the furrows by hand or with a spreader, followed by a disc and cultipacker. They are planted in the spring or whenever there is a chance of rain.

Combinations of Coastal Bermuda with Reseeding Crimson Clover, and with oats are practical and often used.

"The big mistake that is made in starting pastures in the South," says Childress, "is that a man will fence in a peanut field that has been row-cropped to death, fertilize it with two or three hundred pounds of 8-8-8, and think he is going to have a pasture by mid-summer. Pastures here are no different than they are in the North. They have to be given a chance to make good roots the first year. They have to be given a little more fertilizer than up North. We try to give ours a 1½ year start before we graze them.

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"In south Georgia, basic summer pastures are Bermuda grass, both Common and Coastal, Dallis Grass and Lespedeza. We like Cat-tail Millet as a supplementary grazing crop in the early summer. Both rye and millet grow fast in May and June. About 30 days will put them in shape to graze. They can be grazed heavily so small acreages at little cost can give lots of grazing during periods when hay might otherwise be needed. And we don't overlook the fact that Coastal Bermuda hay is about as good insurance against short pasture as a Southern farm could have.

"Most cattle raisers have made provision for both permanent summer pastures and permanent winter pastures. Few believe, however, that year 'round grazing can be maintained without resorting to supplemental pasturage for the few months of the year between seasons. Numerous annuals will grow at these off-seasons. The trick seems to be to find the right combination. We're finding out the key to year 'round grazing in the South depends a great deal on how good your second team is and whether it's ready when the first team wears out."

Then Come Fences

In an area where a single strand of barbed wire nailed to trees used to serve as a fence a well-built 4-wire fence marching off for a mile straight across a pasture is an encouraging sight. And luckily there are not too many turns to make in Georgia fences, for the sandy soil demands that corner posts be sunk deep, with "dead men" on every side.

On Wade Childress' Magnolia Plantation accurate cost figures were kept on all fence building. Some of the cypress line posts were cut on the place and barked and squared, others were bought, when time was short. They cost Childress about 50 cents apiece either way. This figure is high compared to other farms, but his posts are uniform and for showing off his Santa Gertrudis cattle they are probably worth the money. His 4-strand barbed wire fence cost $625 a mile; woven wire 39-inch wide with a single strand of barbed wire cost $825 a mile. And "Kentucky style" 3-board fence came to $1,100 a mile.

On the Sunbred Farms, across the creek, managed by Robert E. Weber of Farmcraft Associates, cypress posts cost 8 to 10 cents to cut. Weber says, "Four men

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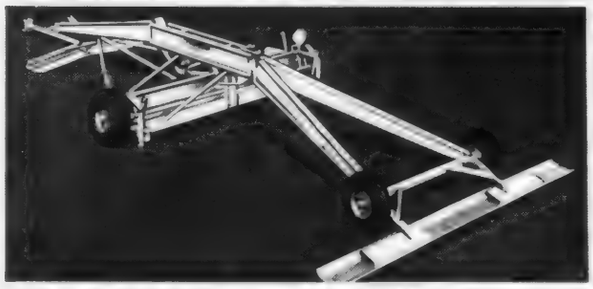

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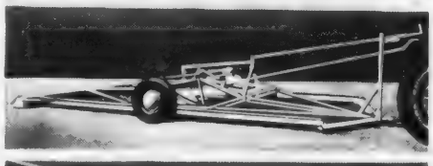

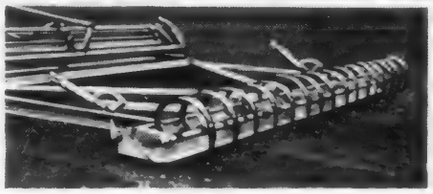

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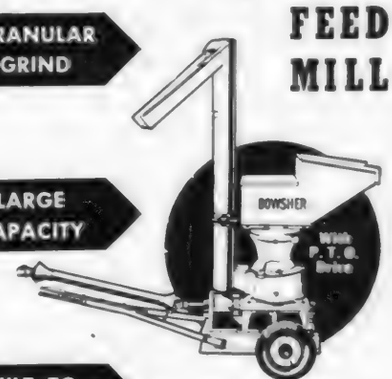

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with a tractor posthole digger can build 80 rods of fence a day. Our cost on 4-strand fence is right at 80 cents a rod using rough but serviceable posts, cut on the place. It's important to use cypress though. Untreated cypress will stand the termites and rot for about 10 years: pine lasts only 2 or 3 years. Posts treated with "Penta," will stay in the ground for 20 years or more.

Pastures, as of now, before development, produce an average of 75 pounds of beef to the acre. With fertilizer, and seeded to the proper grasses, the South's abundant rainfall, 40-60 inches a year, brings pastures up in a hurry. Many of the pastures with 2 or 3 years of good management turn out 250 pounds of beef: farmers predict that ultimately 300 to 350 pounds to the acre will be common. The Coastal Plains Experiement Station at Tiffton, Ga., has produced as high as 500 pounds under ideal conditions.

The general rule, in starting a new pasture, is to allow three acres to a cow; when the pasture is in full swing a cow an acre is not an unreasonable goal.

This possible high concentration of animal population bears out the prophecy one hears throughout the South—that ultimately the South will compete with the West as the cattle kingdom of the country.

Livestock

A beef cattle herd can be started in four ways. (1) Local cattle, both cows and bulls, mostly scrubs with Guernsey and Jersey mixtures, can be bought cheap and are suitable for fat calf production. (2) Local cows, bred to a good Hereford, Angus, Beefmaster, or Santa Gertrudis bull produce good calves which can be sold off the cow, 6 to 8 months old, at a good profit. Cows of this type, even though from scrub dams, produce more milk than the beef breed cows, and the calf does well. These calves weigh from 400 to 600 pounds. (3) Western Hereford-type cows of good quality can be bought and the heifer calves held over to start a herd. A good bull helps out. (4) Purebred beef cattle, Herefords, Shorthorn, or Angus, can be bought out of the West or the North and a uniform and high grade herd started.

In the Midwest, grass fat cattle bring only fair prices from the packers, unless finished on corn or sold to another farmer for feeding out. In the South, grass fat cattle are sold directly to the packer. On a mid-June market day this year grassy, good grade cattle (700-800 pounds) brought $29.00 to $33.00 in Albany, Geogia. In Chicago the same grade brought $27.00. In Cincinnati they brought $26.00 to $31.00. On the same day good to choice feeder calves (400 to 600 pounds) brought up to $40.75 in Albany. In Chicago they brought up to $33.00. In Cincinnati they brought up to $35.00.

If the South produces all the cattle it is capable of producing the question arises as to what will be done with the cattle.

ROTO-HOE

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Are there local markets sufficient to absorb a growing production? Will the South displace the West as the source of supply of feeders? Will the South finish beef for the butcher shops?

A survey of local markets shows that the South produces only two thirds of the meat it consumes. Its cities are growing while its rural population is shrinking: industry is moving rapidly to the area. The diet is being enriched with more meat. This means that for a long time to come, cattle production can be absorbed locally. When the time comes that there is a surplus, the South may supply some feeder stock for Northern feedlots and some medium grade "chain store beef" for the Eastern states. But in all probability the chief income will be from grass-fat cattle, grading from good to low choice for local consumption. Most of the major packing companies have plants spotted at strategic points in the South. There are stockyards in almost every city in Georgia and Alabama, and nearly every county has its weekly livestock auction.

Dairying in the South—what there is of it—is booming. This whole area is milk-short and imports fully a third of its dairy products from the North and East. The management companies have not yet gone into dairying, chiefly because of lack of competent dairymen for their farms. In the South today, any man who knows anything about dairying, and has competent help, will stay with it as long as milk is priced at around $6.00, about a third higher than in the North. Recent experiments show that good dairy cows can produce an average of 8,000 pounds of milk a year on forage alone if it is top grade pasture.

Not Everything is Perfect

The warm climate that produces the South's great asset, the almost year-round pastures, also is responsible for sizzling hot summers that wring the energy out of man and beast. And with heat comes flies, gnats and bugs. Cattle must be sprayed several times during the summer against flies. Pink eye spreads rapidly because of the gnats that are nearly always hovering around the cattle's heads. Then there are screw worms and an assortment of fly maggots that make is necessary to treat any open wound to prevent infestation.

Treating wild, range cattle brings up another problem: How do you get close enough to do the job? In the South they use several methods. Two or three cowboys can round the cattle up and lasso them, Western style. Or you can use a Jeep as they do on one large farm near Americus, Georgia. Here "Spike," the herdsman, takes off after a calf with an assistant driving the Jeep. After the calf tires the herdsman jumps out and runs him down. The Jeep comes alongside with the medicine and the operation is completed. Pens and chutes, for sorting and inspection, are becoming standard equipment and make the job easier.

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The hot, humid summers, make farm grain storage almost impossible without steel storage bins and heated drying equipment. After drying the grain must be checked often during the storage period and fumigated for weevils. The loss from weevils runs as high as 25 per cent in untreated grain. Grain treatment with Pyrenone, or a similar fumigant, gives a full season protection. Like modern fly sprays it has a residual effect.

In almost any year the South can count on 50 inches of rainfall, which by Midwest standards seems adequate for any crop. But much of the soil is sandy and when rain falls it goes right on through. A week of dry weather makes the corn blades curl; two weeks makes it look sick; a month without rain is a disaster.

Most of the soil in the South needs rejuvenation. Humus is nearly always lacking, and it must be gotten into the ground if row crops are in the farm plan. Fertilizer is needed in huge quantities for row crops or pastures; 500 pounds of fertilizer a year seems to be a standard figure. All of this requires a big cash outlay for labor, equipment and materials. Farm profits in the South are no ripe apple ready to be picked. It takes experience, hard work and attention to details. It requires as much "know-how" to make a success here as in any other part of the country.

The Working Farmer

What does the South offer the working farmer who buys land with less than $15,000 in his jeans?

Gene and Dave Schubert of Butler County, Ohio, worked on the home farm with their father since they were out of short pants. The three of them built up one of the best Polled Shorthorn herds in the country and made some money. But both boys wanted places of their own. They looked around at farms for sale in their neighborhood and saw their capital wouldn't go very far with land at $300 an acre and machinery sky high.

"Let's go South," said Gene. He had been down there showing cattle and liked what he saw. The brothers took a swing through Georgia, Alabama and Mississippi. They had a good eye for land and its possibilities—four generations of farming blood had taught them that.

Near Crystal Springs, Mississippi, they saw what they wanted, 250 acres of brown loam. It was almost level. A sharecropper had 25 acres in cotton and 10 in corn, and there were about 20 acres of waste land, a few wet spots and some scrub second growth. The remainder was in native grasses — Bermuda, Dallis grass, Johnson grass, and White Dutch, in fair condition. It was fenced and cross fenced twice. There were no buildings except three cabins.

"Some boys had a party in one of the cabins one night and burned it down. It wasn't much of a loss," Gene says.

"The first year our cattle had no shelter. We put up some rough sheds which

are little more than wind breaks, but all that is needed during the mild winters."

They bought the farm at $40 an acre. "We made a good buy. We caught the seller at the right time and did some horse trading," Dave explains.

The cost of the land about cleaned out their bank account. They got a loan and bought a tractor, a disc—which they say is the most important piece of machinery in the South—and a power seeder for the tractor. They have since pooled with neighbors in the purchase of a baler, rake, cultipacker, and a lime spreader, which they use for fertilizer and planting oats. They trucked down 100 head of stock they had on the Ohio farm, and started improvements, a field at a time. Their plan is to make the land pay for its own improvement — lack of capital made it necessary that the farm bring in some cash from the start. The pastures had been limed (slag) and had a small application of potash just before they bought it. They turned in their cattle at once and confined their improvement on the pastures to frequent clipping.

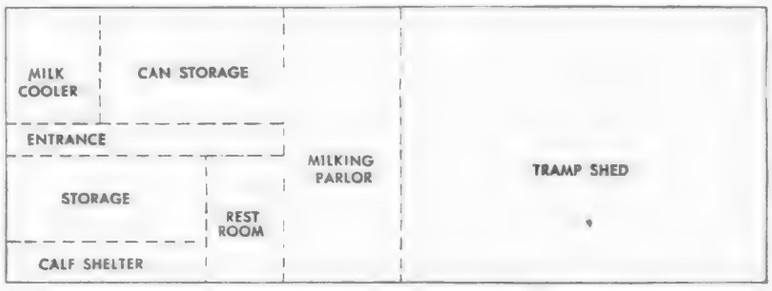
They put in 30 acres of oats, followed by lespedeza and 20 acres of corn for silage. After three years of ownership they have improved all but about 100 acres. The basic pastures provide grazing for 125 head of cattle—50 brood cows and their offspring, until November or December, when they start feeding hay to piece out. The improved land gives them their hay crop. They pasture the oats during the winter months and then take off a grain crop which averages as high as 50 bushels to the acre.

"Oats," says Gene, "are not the final answer to winter grazing. When a spell of real cold weather comes along the oats stop growing. I think we ought to have a grass which will give us good quality dry forage on the fields during the cold months. Perhaps Kentucky 31 Fescue or Coastal Bermuda would be better than oats."

The goal for the Schuberts is 100 head of brood cows, plus their calves, fed the year around on pasture and hay produced on the farm. They are now putting in a trench silo in which they will use grass, and perhaps some sorgo and corn to tide their herd over the two winter months. They are not too well sold on the possibility of twelve months pastures. It's cheaper, they think, to take 10 and feed 2. They will put in a little barley for calf feed.

The Schuberts have invested a relatively small amount per acre on improvements—machinery and cattle are the big items. Dave, with one negro helper, at $125.00 a month, is doing all the work. He has taken his living off the place, and turned the remainder into improvements. In five years the brothers expect to be producing 300 pounds of beef per acre, and to have the entire farm under improved pastures. This is a gross of $18,750 from 250 acres.

ROOMY, COOL AND COMFORTABLE are these Butler Buildings used by Mr. Haynes for dairy barn and implement shed. "Here's why I am happy I bought two Butler Buildings," Mr. Haynes says. "I like the clear span and straight sidewalls. The buildings hold more and are more adaptable. Also, even in these hot Indiana summers, I find my aluminum-covered buildings cool and comfortable."



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Irrigation of a level, bottom field of 70 acres from the creek which crosses the lower edge of the farm is also in their plans for the future. "Irrigated, improved pasture down here would give us enough grass for three cows to the acre," says Gene. "You can't get that out of an acre in the North.

"Where could you find an opportunity like this in the Corn Belt?" he asks. "Why, with our $15,000 capital you couldn't even buy the machinery necessary for a 250-acre farm."

The brothers have found that damnyankeeism is a myth so far as their particular community is concerned. "As soon as I got here neighbors came in and offered to help me," Dave says. "We have a machinery pool and trade work. We had no trouble getting a loan, and we have all the social life we have time for."

Gene points out that his brother's quick conquest of southern hospitality may have been influenced by his marriage to a pretty and popular Crystal Springs girl soon after he moved there.

The Management Companies

Farmcraft Associates, Inc., a farm management firm, opened its Americus, Georgia, office in the fall of 1949. In the Americus and nearby Albany areas they now manage 35,000 acres for 18 farm owners. The company manages both timber and farm lands and is handling a much larger acreage through its offices in Houston, Texas, and Alexandria, Louisiana. Floyd Elliott of Farmcraft says: "Based on nearly 20 years of farm management and appraisal work in the Cornbelt the basic advantage of the Southeast is its combination of a short mild winter, fairly good rainfall and relatively cheap land. This makes a natural opportunity for beef and dairy cattle. The best management in Georgia will usually include some corn, small grain and peanuts along with pasture."

Opekasit, Inc., a farm management company of Hamilton, Ohio, has 17 units totaling 47,000 acres in the Albany area in South Georgia. Opekasit has been in operation in this area only a little over a year, but is increasing its operation as fast as competent management can be trained. Opekasit, Inc., charges a basic management fee of 6% of the owner's adjusted gross income. Minimum fees, however, are established for each farm, based on size and amount of rehabilitation to be done. Bob Lovett, President of Opekasit, says, "Right now, even in the present undeveloped stage of our grass and cattle program, we can produce a pound of beef for much less than it costs in the north.

"As soon as we can build up the soil, we can expect to raise our corn yield as high as that in the corn states. We intend to keep on with peanuts, corn, wheat and oats in rotation. Peanuts and corn often keep the wheels turning for an owner who is short of development capital."

Farm management fees range from

$1.50 per acre up and down as the size, type and concentration of the operation varies. Floyd Elliott of Farmcraft says, "Our average fees work out 6% of the adjusted gross income on 3000 acres or more, 7% on 1000-2900 acres and 8% on less than 1000 acres. The adjusted gross income is the total sales from the farm less purchased feeder cattle or hogs (or book value of breeding stock) and purchased grains or hay, i. e., gross income of farm less those purchased things which the farm would ordinarily produce itself. On a new farm being put in production we use a minimum charge of $1.25 to $1.75 per acre of tillable land and 45c to 60c for the balance of the farm. The net cost to the owner is actually less than the rates quoted because he benefits from our bulk purchases of equipment and supplies and our supervision of the sales of livestock and grain."

Anyone wishing to find out if there is farm management or appraisal service available in any section in which he is interested, should write to H. E. Stalcup, Secretary, American Society of Farm Managers & Rural Appraisers, Storm Lake, Iowa.

What's in it for the South?

Several years back Southern farm experts set up tested plans for Southern farmers, showing them how to use modern pasture and farming technique to pull themselves up by their bootstraps. Now, with Northern money to help out the willing Southern farmers we can look for these results: (1) A greater supply of agricultural working capital which will provide more tools, fertilizer, and livestock; (2) A reduction in the South's terrific loss from erosion; (3) An increase in the ability of the land to withstand droughts and floods; (4) A balance of food resources of the South against the demand, especially by adding meats and dairy products which will create a more self-sufficient and sounder economy; (5) An improved soil fertility level which ultimately means better farm profits, more food production and a healthier people.

WINTER OATS

(*Continued from page* 43)

one was enough and if they weren't a dozen wouldn't do you any good. If oats get killed out they get killed, period, and the only result of planting more heavily would be to get more killed.

"I did sow 3 to 4 bushels to the acre with these Atlantics, though, because their seed is larger, meaning that you get fewer to the bushel.

"What about fertilizer? Well, I generally use 400 to 500 pounds of 2-12-6 or 3-12-12 before planting and I always top dress with 100 pounds of ammonium nitrate in March.

"They yielded me right about 80 bushels per acre. Not too bad considering the winter they came through."

As to spring oats, Duncan deposes,

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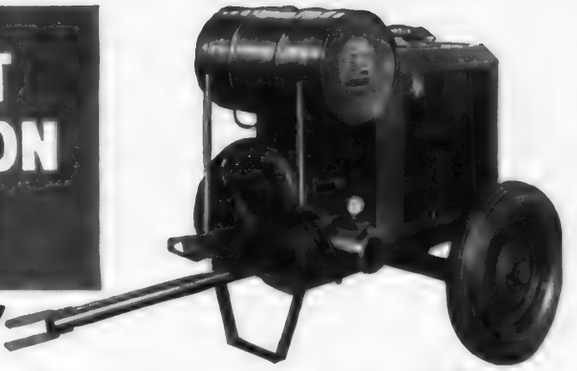

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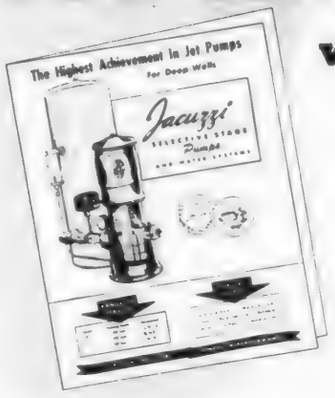

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"My Leach Silo Unloader acts as my hired man. The ease of operation, plus its safety, means much to me. It handles the grass silage in a fine manner."
RALPH J. FOX, Marysville, Ohio

"Our Leach Silo Unloader is doing a wonderful job of throwing out grass silage. We are feeding 430 head of steers and would be unable to handle this number of cattle without extra help except for the unloader. We have also noticed a great deal of difference in the palatabilities of silage thrown out with an unloader. The cattle really go for it." MARY DALE FARM, Lafox, Illinois

"I have used a Leach Silo Unloader for two seasons on grass silage and it has given trouble-free service. The cattle like the grass silage much better because it is all broken up, even when frozen. Since there's no waste, the feed goes farther. I run the machine twice a day for a total of 24 minutes to feed 28 cows. I am very well pleased with my installation."
ELLIS RAY, Charlotte, Mich.

"We have had a Leach Silo Unloader working in grass silage for the past year. The discs bring the silage out in good shape, whether frozen or not. It is a real labor saver. The silage is more fluffy, and there are no chunks or flakes to worry about. It throws down enough silage for 64 head of beef cattle in 18-20 minutes."
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"they're just too hard to get in, so I don't fool with them."

To all of which David Reid, Agronomist at the Kentucky Experiment Station, had a few words to add.

"Don't let the term 'winter oats' fool you," says Reid. "They're not winter oats at all in the sense that we have winter wheat. Actually they are 'winter-hardy,' which is a different thing. This means you have to be pretty careful about when you sow them. Unlike wheat, if you get them in too early they are liable to go right on and head out before cold weather. Another thing about early planting with Atlantic is that they are likely to be subjected to Victoria blight if they get too much warm weather. Too late planting, of course, means running the risk of winterkill by going into cold weather with tender, young plants. The best date for sowing winter oats is September 15 to October 1 in the vicinity of Lexington, about ten days later down in Bill Duncan's territory."

Oats for Grazing

While Duncan doesn't pasture his winter oats, some farmers feel that pasturing is a necessity to keep the crop from getting too high before cold weather. Like the other small grains, in their younger days oats provide excellent pasturage, producing as much total digestible nutrients as grass or legumes.

Grazing experiments conducted in Tennessee point up two facts: first, that late grazing in the spring will result in serious reduction of grain yields, especially if grazing is followed by low temperatures; and secondly, that reduction in grain yields can be kept to a minimum by the application of a nitrogen fertilizer at the time of seeding followed by an application after each grazing.

During a two-year period Tennessee checked the gains made by ten calves running during the winter on oats pasture as against ten that were barn fed. Those on pasture gained an average of 68 pounds per head more than the barn fed group and it was estimated that the pasture replaced about five tons of alfalfa hay each year. The pasture was stocked at the rate of one calf to 1¼ acres and the grazing period was from December 15 to April 15. Despite the fact the grazing was permitted much later than generally recommended and even though no nitrogen at all was applied to the oats, since they followed alfalfa, grain production averaged over 50 bushels per acre.

The Tennessee Station has some interesting recommendations on fertilization of oats, too. The chart on page 43 is a result of their experiments along this line. It shows that spring is definitely the time to put the nitrogen to oats. Fifteen pounds applied in the spring is as effective as 30 pounds applied in the fall and 30 pounds in the spring is of considerably more effectiveness than 60 pounds in the fall. This is a definite endorsement of spring

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top-dressing. Where a split application was made with 30 pounds applied at the time of planting and another 30 pounds added as a spring top-dressing, the yields were comparable to those obtained from the spring top dressing of 60 pounds.

An important consideration in fertilizing oats is the effect of the application on the companion crop. A rank growth of the grain crop may result in reduced stands and subsequently reduced yields of the following hay crop. A common observation with lespedeza has been that the best crops were obtained where nitrogen was withheld entirely from the grain.

When it comes to feed, it is estimated that a 60-bushel oat crop produces just about the same amount of grain as a 35-bushel corn crop. When the other advantages of the small-grain crop are taken into consideration, the reduced labor requirements and their excellence for pasture and soil conservation, a corn crop has to go 50 to 60 bushels to equal a 60-bushel oat crop. No wonder oats are finding new popularity in the south.

It is interesting to note that spring oats, which have always found hard going in Kentucky, are now being reinforced with a recruit from Minnesota known as Andrew. Until now, Columbia has been the most popular spring oat in the state. Clinton, which is a leader in the neighboring states to the north, matures too late and finds the climate too hot. The new Andrew is better than Columbia in yield, showing an average of 59.8 bushels per acre at Lexington as against 52 bushels for Columbia in six years of testing.

The newcomer is resistant to the common races of crown rust and to Helminthosporium blight and has a stiff straw that stands well for combining.

Just across the Ohio River, the Indiana Experiment Station is in the final stages of testing a new winter-hardy oat, still unnamed, that resulted from a crossing of Forkedeer on Clinton 59 and Landhafer, the latter a rather poor spring oat that came to this country from Germany by way of South America, but which has the distinct advantage of being resistant to races of rust to which Forkedeer and Clinton 59 are susceptible.

Two years ago Dr. Ralph Caldwell of Purdue had just one panicle of this oat. This summer 50 acres were harvested after intensive work on test plots and in green houses.

This new oat will be adapted to only the southern third of Indiana, but Dr. Caldwell and his associates are very hopeful that it is going to provide an important new tool for farmers in that area. They are particularly interested in its possibilities for pasturage and, as in Kentucky, its importance as a conservation crop will be stressed.

"Oats are a feed crop rather than a cash crop," says Howard Lathrope, a top-ranking agronomist of Purdue's Extension

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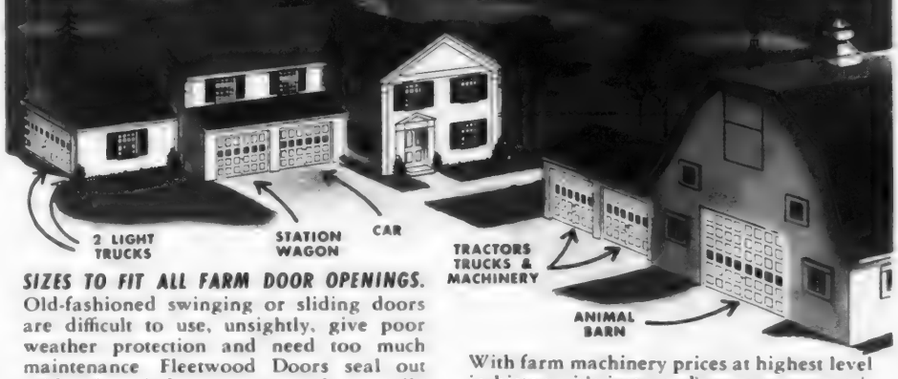

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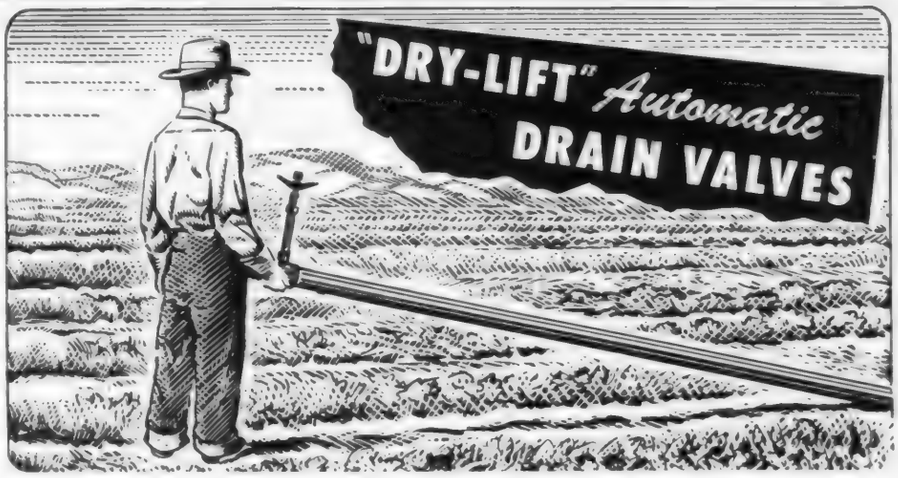

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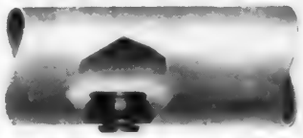

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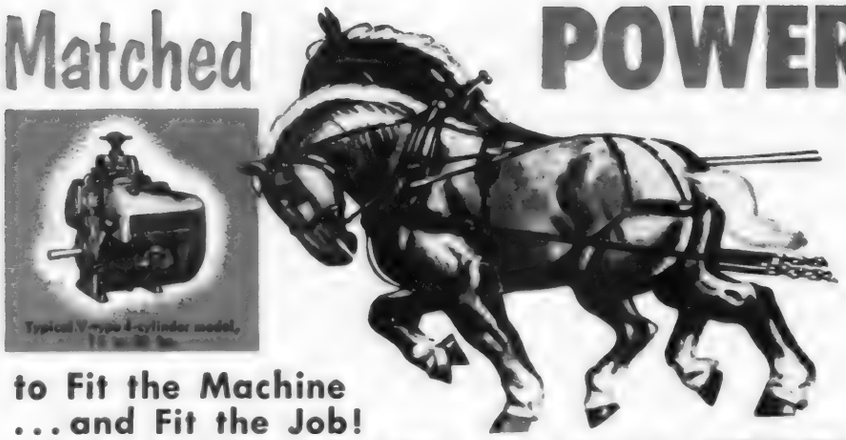

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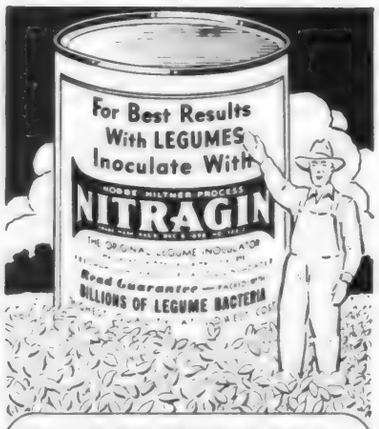

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"Soybeans are losing money on small farms in southern Indiana—the ones that produce only 15 to 18 bushels per acre. These are the places where winter oats should find a hearty welcome."

Farmers in southern Indiana have been having considerable success with small-grain pasture. One individual claims he made 200 pounds of beef per acre off wheat; others say they graze oats practically all winter. But there are dissenters, so far as oats are concerned. "I'll take rye for winter pasture any time," is Bob Crock's opinion. Bob farms near Evansville. "I've tried oats. You graze them down and they stay down. Give the rye a little rest and it will come right back."

Farther south, in Georgia and many other Southern states, winter oats are *the* grain crop. They are sown in September and October with a starter of 500 to 600 pounds of 3-12-12. By the first of December they have a good, healthy growth and are ready to receive the cattle that are turned on them for the entire winter. If well fertilized they will handle a cow per acre.

In mid-February, and again in March if the grazing has been heavy, they get a top dressing of ammonium nitrate—sometimes as much as 200 pounds per acre. By early June they combine 50 to 60 bushels to the acre.

In the deep South, winterkill has never been much of a problem with oats. But in the northern part of the winter oats section the farmer knows that the odds are that he is going to lose one crop out of three. At the rate the breeding programs are going forward, though, it shouldn't be too long before "winter-hardy" is an absolute rather than a relative term.

THE GOOSE COMEBACK

(*Continued from page* 51)

tering: "He cluttered here, he chuckled there, and filled the house with clamor." Dickens roasts him for Tiny Tim's Christmas dinner, although a goose, which contains more fat than any other poultry, is said to be hard to digest. An old cook book advises, before roasting that fowl, "Parboil for two hours, at least." It should be said though, that young geese under four months old, known as "green geese," are tender and are usually on the market from November to January.

Geese dress out with a good edible proportion of meat to live weight — about 65 per cent can be put in the roaster. For best flavor a goose should be well fattened. The excess fat can be removed by pre-roasting for about 30 minutes in a 350° F. oven. Poke the skin with a fork several times so the goose fat can come out, then pour off the fat and save it for cooking and basting. It is an excellent fat and has a neutral flavor. The goose can then be stuffed and baked for 3 hours in a 300° oven. Don't let the temperature go higher

or it will cause the bird to toughen and lose flavor. Orange juice can be used to baste the goose instead of the goose fat. Test the legs with a fork to see when the meat is well cooked.

The popular breeds of geese are the Embden, white and the largest variety; the Toulouse, a large grey goose; the African, which has a dewlap like a Brahman cow; the China, a small breed which makes a fine roast goose; the Roman, a popular European breed that is also small and of fine flesh. The Pilgrim has been in great demand lately, because you can tell a goose from a gander. This is a difficult decision in other breeds for they are almost identical. It has never bothered geese, however, for they felt it was no one else's business.

Goose eggs hatch out in 30 to 35 days, depending on the breed. Geese will hatch their own eggs or 3 to 7 eggs can be set under a hen.

Geese make interesting pets after they become well acquainted with the members of a family; any stranger arouses their suspicion and they will set up an alarm. Some poultry raisers keep them as watch dogs. Most of the year they require nothing but grass and water, but in the winter geese need some leafy hay and a mash of cracked corn, ground oats and bran. A complete and interesting book on geese is "Successful Goose Raising" by Lewis Glaser of Box 123, New Haven, Conn. It costs $1.00.

During our own generation it remained for a man by the name of Bird (J. J. Bird, extension horticulturist of the University of Tennessee, at Knoxville), who had been promoting better farm practices and production methods among fruit growers of several states, to introduce the crab-grass-eating bird to Tennessee farmers in 1947, and to establish the "goose management plan," after having first tried it in cotton, as well as strawberry fields in Michigan, Kentucky and Arkansas.

Briefly this is his management plan:

1. Use 4 geese (preferably 2 ganders and 2 females) to an acre, that is well protected by a good, high fence.

2. Construct roosts, off the ground and roofed, at one end of field.

3. Keep drinking water at opposite end of field. Do not have any other water in sight, or, like small boys, they will desert their weeding to go for a swim.

4. Clip bottom wing feathers if the birds show a tendency to fly.

5. Give them a small amount of corn each day.

A good investment, geese have been known to live to be 30 or 40 years of age, in spite of hard pickings for a living. Seemingly adaptable to any environment, the goose, also known as *Anser Domesticus*, is here to stay, for the simple reason that he can live well on water and crab grass.

THE AUTHOR: Josephine Neel Wallen now lives in Murfreesboro, Tennessee; she grew up on a farm near Nashville. She still has an intense interest in farming and likes to write nostalgic articles about her days on the home farm.

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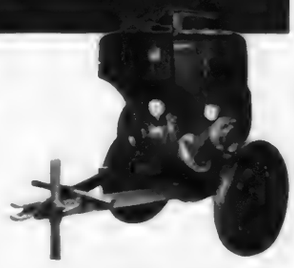

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APPLE BUTTER BEE

(*Continued from page 36*)

years," she says. "Before that I helped my mother make it. I remember how she'd always call me early on apple butter day. 'Come on and get up,' she'd say. 'We got to get that apple butter cookin' so if it rains we'll get it in anyhow.' I make it the same way she did and she got the recipe from my grandmother and I don't know where my grandmother got it."

Just about this time of year when the Pennsylvania hills are splashed with color, she'll again have her apple butter kettles boiling as fast as Mark can make them boil with hand-split pine and oak. And she will have help at the chore, for in recent years her neighbors have been gathering at the Campbell farm to help with the job. There, 18 miles north of Pittsburgh, is held each year what may be the only apple butter bee in the country.

The whole neighborhood pitched into the job as a church activity. The women were wondering how they could make money for the church when someone suggested they make apple butter to sell.

"Every year," says Aunt Ess, "somebody will say 'How about makin' apple butter again?' Then up will go the hands. And down will go the names on a piece of paper. One will say, "I'll bring 10 bushels of apples." Another can bring five. Then some of them will volunteer to go pick the apples. The men go 'round and gather up the baskets and haul 'em over here."

About a week before the apple butter bee a few men will show up at the farm to help Mark split wood for the fires. "It sure takes a pile of it," he says. Then the old copper kettles . . . and nothing else would do, are brought out from the shed. One holds 25 gallons, the other 15. A third kettle with a 40-gallon capacity is borrowed every year from neighbor Maggie Patton. The Campbell's copper kettles have a past that is only partly known. "I got 'em from my mother," says Aunt Ess.

The way Aunt Ess makes apple butter it takes not one day but two. "The first day, and that was October 9th last year," she says, "we wash and core the apples and cook 'em into sauce. But we never peel 'em. It's the peel that gives apple butter its good flavor and the light color. The peel also has a lot of good stuff in it. Woman came here last fall to buy some. Said up in her neck of the woods apple butter is always black and doesn't have much taste. They don't know to leave the peels on.

"Well the first day we cook 'em up into sauce. Then we run 'em through a delver to take all the lumps out. When that's done there's apple sauce in 10 or 12 big crocks and dishpans and everything we can find to hold it 'till the next day."

On the second day women start arriving while the frost is still on the firewood. "Generally one of 'em stays all night," Aunt Ess says, "so we can get an early start because apple butter has to boil all day long. Last year we had 14 here to

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help all day." Each woman brings food for the pot luck dinner and Aunt Ess usually has a stock of fresh baked pies on hand for the crowd.

The first chore, and one of the most important, is cleaning the kettles. Salt is moistened with vinegar and this compound is used to scour the copper kettles until they're spotless. "You have to be careful to get any burned spots off," says Mark, "for sure's anything that's where she'll burn again."

Mark has the three fires going out on the edge of the garden by 6:30. "It's got to be boilin' by seven," says Aunt Ess, "and a jumpin'-a-boilin' by eight. Then you got to keep it boilin' as hard as you can all day long."

"We start off burning pine to make a quick fire," Mark says, "then oak to keep a hot fire."

"And when we dump all that apple sauce in," says Aunt Ess, "we put half a dozen peach seeds in each kettle to help keep it from stickin' when we stir it. We also boil five gallons of cider fresh from the mill 'till we've got one gallon of syrup and divide this among the kettles. That helps give it flavor. Then we put two buckets of water in each one to thin it down."

No sooner does the apple sauce start its gradual transition to apple butter than Mark takes up his long handled paddle to start his day's stirring. He sits in a battered old wicker chair left there at the cooking spot from year to year for the purpose. Throughout the day he stirs constantly and contemplates the miles of rolling landscape through the steam from his apple butter kettles.

"Let her go a couple minutes and she'll stick, sure as shooting," he says. "My paddle has a square handle to keep it from turnin' in my hand and makin' me think I'm stirring bottom when I'm not." The blade of the paddle, with a flock of holes drilled through it, is made of oak and curved on the bottom to fit the kettle.

Mark also keeps a big, long spoon handy to scoop out any flecks of charred wood that pop into the kettles. "That doesn't hurt it a particle," says Aunt Ess.

"Not a particle," echoes Mark.

While the apple butter cooks, he stirs his kettle and keeps an eye on the stirring of the other two. The women busy themselves at a long work table washing quart and half gallon jars to hold the finished apple butter.

Stirring, according to Aunt Ess, does more than keep the apple butter from burning. "I think cooking it out in the open like that and stirring good fresh air into it all day makes it taste better."

"We keep it cookin' till about the time the school bus comes in the afternoon before it's ready to take off. In the last hour we add a half-cup of salt to each kettle. Then we put in cinnamon to taste. That's when the sugar goes in and it needs three pounds to the gallon. Lots of people ask us how we measure the

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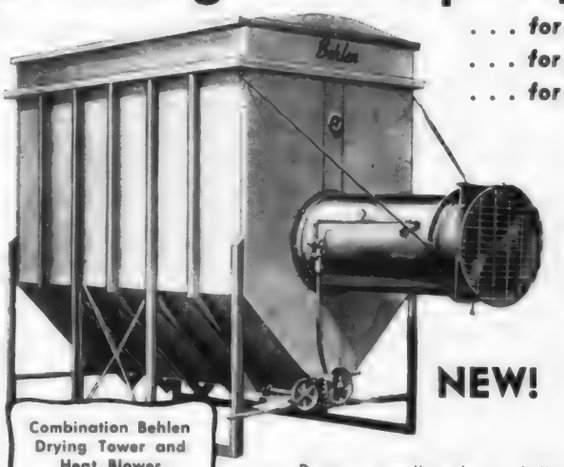

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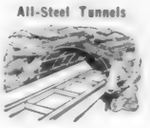

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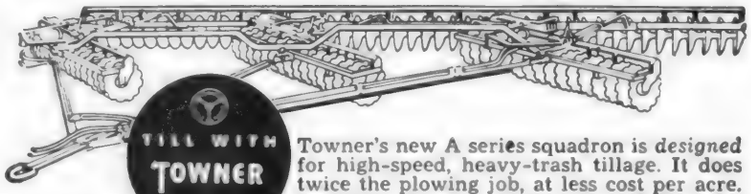

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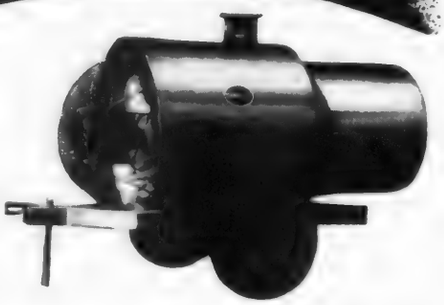

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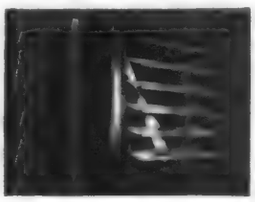

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sugar. We just know how much it takes and don't have to measure it. Afterwards when we count the gallons of apple butter and the pounds of sugar we used it comes out three pounds to the gallon every time."

The neighborhood women spaced around the work table, bottle the apple butter on something of a production line basis. One sees that the jars are clean, another fills them, a third covers them with paraffin and still another puts on the lids and seals them.

By this time the school bus has gone on down the gravel road, but not before a flock of children, including some of the Campbell's 14 grandchildren, have jumped off and run across the yard yelling for warm apple butter. "Then they race in the house and get some bread," says Aunt Ess, "and the bread and apple butter keeps 'em quiet for a while."

Part of the apples used at the apple butter bee, came from the Campbell's orchard of 30 trees out west of the house. These trees are Winesap, Baldwin, Jonathan and Big Twig. "You just can't beat Northern Spies and Baldwins for apple butter," says Mark. "You can make good butter from any apple that makes good sauce. The early varieties aren't so good for apple butter."

Apple butter is part in the making and part in the eating. The Campbells have developed some fixed ideas on how apple butter should be eaten. "It's good with cream for desert," says Aunt Ess. "Or you can make apple butter tarts with pie dough. Spread it on pie dough and spread strips of pie dough on top and bake 'em. Some people like it mixed with cottage cheese. I even know one man likes it mixed with horseradish. But we still think the best way to eat apple butter is on bread. Get a slice of warm home baked bread about an inch thick, spread a lot of country butter on it and spread that with apple butter. That's when you figure apple butter makin's worthwhile," she says.

"That's a fact," adds Mark.

ARTIFICIAL INSEMINATION

(*Continued from page* 40)

tions in order to have good reproductive efficiency among cattle.

Breeding troubles are often caused by diseases or infections. These along with other disorders such as cystic ovaries, retained corpora lutea (yellow bodies), and non-functional ovaries are problems which the veterinarian may be able to help the dairyman solve. Following good sanitation practices, and getting the veterinarian on the job at the first sign of trouble should keep the losses from these troubles at a minimum. In most cases of reproductive failure, more trouble is encountered when the farmer delays in calling the veterinarian. A sound rule is to call in the veterinarian if the cow fails to conceive after three services.

Some farmers are afraid that the inseminator technician might bring disease onto the place. "My friend Dave Shawn came over here the other day and started telling me how dangerous it was to have the inseminator tracking in here from every farm in the country," William Gordon, an Oregon dairy farmer said. "I told him, 'Did you ever see the inseminator work? He pulls on a pair of clean rubber boots when he gets out of his car and he uses a sterile glove and a new inseminator tube to do the breeding with. When he's through, he breaks the plastic tube so that it can't be used again. Then he scrubs off his glove and all of his other equipment in a strong solution of quaternary ammonium, and just before he gets in his car to leave, he scrubs off his boots, tops and bottoms and soles, in the same solution. Why, Dave,' I said to him, 'I don't stand near the chance of him bringing Bangs onto the place as I do from you walking over from your barn with manure all over your feet."

Is the Inseminator on the Job?

Are inseminators doing their job as they should be done? Often the farmer blames the inseminator for the troubles he is having, and he may be right. Some inseminators may very well be incompetent and careless. There is a check, however, on all of them. Their daily reports are scanned and compared at the central office. If conception rates in their districts are abnormal or if membership complaints indicate they are doing a bad job, they are called in to go over their work and find a way of improving it.

When the inseminator drives into the farm yard today carrying his refrigerated case containing the plastic tubes of bull sperm, dyed various colors for identification, his packet of inseminating tubes, his rubber gloves, and other equipment, he is better trained and better equipped than the technician of a few years ago. Behind him is an organization which rushes the prepared semen to him a few hours after collection, often by plane and parachute as in Ohio and Missouri: an organization which is keeping abreast of new research and which keeps him informed on the latest developments.

Instead of the speculum method of inseminating, for example, most technicians now use the technique which permits them to thread the thin inseminating tube into the cervix or neck of the uterus and thus stimulate the uterus to the muscular contractions necessary to transport the sperm to the oviducts where fertilization takes place. Most inseminators make it routine practice when breeding cows presented for the second service to deposit the sperm into the cervix and not into the uterus. Uterine deposition of serum in pregnant cows will terminate the pregnancy and most technicians now recognize that three or four per cent of cows come in heat even though they are pregnant.

The semen which the technician brings

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with him is more likely to be viable than a few years ago. Better techniques in the laboratory insure that in each cubic centimeter, the amount needed for one insemination, there will be from 5,000,000 to 10,000,000 living sperm. Careful record keeping and culling of bulls eliminate those bulls which have an unsatisfactory conception record.

The inseminator often gets blamed for showing up too late. Most inseminators wait to begin their morning rounds until after the farmers have finished their milking and had a chance to phone in their requests—they also keep in touch with their homes or check points, such as a gas station or feed store, during the day to pick up further calls. If a cow first shows heat in the morning, the inseminator will plan to breed her that day. If she comes in heat in the afternoon, he will try to breed by noon, or soon thereafter, the next day. This works out well, providing the farmer notifies him properly, since the best time to breed is from the middle to the end of heat, and reasonably good results are obtained even if insemination is within six hours after the cow goes out of heat.

A run of consecutive bull calves in a dairy herd can be a calamity. Such runs are sometimes blamed on to the inseminator. Neither the inseminator nor the individual breeder can control or predict the sex of the calf. It is a matter of chance. The egg produced by the cow is neutral and the single sperm which penetrates the egg and fertilizes it determines the sex of the calf. From natural mating about 106 bull calves are born for each 100 heifers. This same ratio is true of artificial insemination—an Illinois survey showed 105.9 bulls to 100 heifers. The average, however, doesn't prevent an occasional dairyman from getting all bulls or all heifers—one lucky farmer in Marion County, Illinois, recently had a run of 16 heifer calves—a 66,500 to 1 shot. It isn't likely, but it can happen. Every once in a while we hear claim that someone has devised a system for controlling the sex of the offspring—all such claims have proved to be false.

The New Discovery

Of far more importance to the future of artificial insemination than the false claims of those who would control the sex of the calf are new scientific developments which promise dramatic changes in the whole program. The long sought dream of preserving spermatozoa indefinitely by freezing it at temperatures much below zero may have been realized at last. The experiment has been worked on a small scale, it is true, but it *has* been successfully performed. As sometimes happens in science, British investigators found quite by chance that additions of glycerine to diluters for semen permitted them to freeze the semen and still retain a high

(*Continued on page* 126)

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FARM BOOKS

(*Continued from page* 12)

sheep, poultry, cash crops, grassland farming; and a final section on farm management subjects such as choosing and financing a farm, the need for securing advice and sources of information, record keeping, marketing, and the like.

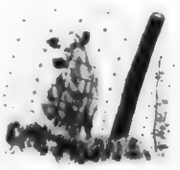
A Dutch Fork Farm Boy, by J. M. Eleazer, University of South Carolina Press, Columbia, S. C., $3.50.

J. M. Eleazer believes in the old saying, "The Lord takes care of fools and children." That, he says, must be why country boys grow up. Fortunately for those who like to reminisce, the Almighty did keep a watchful eye on this one-time County Agent, permitting him to survive the escapades of a boyhood in the stone hills of the Dutch Fork region of South Carolina and write about them 40 years later.

Passing years seem only to have sharpened Mr. Eleazer's memory of the first barefoot days of spring, the baseball games in the cow pasture on a summer Saturday, the old-time cornhuskings in autumn — when a particularly daring farmer might have a demijohn of "One X Corn" out back of the barn—and the 'possum hunts on frosty winter nights.

The diligent and thrifty Dutch Fork farmer was secure in the knowledge that summer or winter there was always plenty of the necessities. Meat scraps and hardwood ashes were saved for soapmaking, apples and pears were dried for winter eating, herbs and medicinal plants were gathered in the woods, the smokehouse, kraut barrel and cellar served a constant purpose. Even yet the long ago winter-day aromas of sauerkraut warming on the stove, baking sweet potatoes, cured and smoked country sausage simmering in the pan, crackling cornbread hot from the oven, and buttermilk fresh from the churn tantalize the author.

The Farm Book Store



The Editors of the Farm Quarterly, after a careful selection of current agricultural books, recommend the following to our readers.

Livestock

The Hog Annual—*by the editors of Farm Quarterly* $5.00
For complete facts on this new book, see page 134.

Pork Production—*by W. W. Smith* $5.50
A revised edition of this excellent book for the hog farmer.

Livestock Health Encyclopedia—*by Rudolph Seiden* $7.50
An alphabetical reference book on animal diseases and sanitation.

Restraint of Animals—*by J. R. Leahy & P. Barrow* $3.50
Line drawings and text tell how to hold animals for treatment.

Feeds and Feeding (21st ed.)—*by F. B. Morrison* $7.00
The authoritative book on livestock and poultry feeding.

Dairy Science (2nd ed.)—*by W. E. Petersen* $6.00
A new edition of one of the best and most complete books on dairying.

Sheep Management and Diseases—*by H. G. Belschner* $10.00
Written by an Australian authority, this book is for all sheep men.

Beef Cattle—*by Roscoe R. Snapp* $6.50
A carefully revised edition of this excellent book on beef production.

Successful Poultry Management—*by M. A. Jull* $5.00
The second edition of this practical book on poultry.

Farm Management

Soil Development—*by E. H. Faulkner* $3.00
The author of *Plowman's Folly* starts another controversy.

Farmer's Tax Handbook—*by J. K. Lasser* $4.95
A guide for saving taxes on farm income.

A Practical Guide for the Beginning Farmer—*by Herbert Jacobs* $3.00
A book to give you an intelligent start in farming.

Modern Farm Management—*by Andrew Boss & G. A. Pond* $6.00
The principles and application of management to the farm.

Farm Work Simplification—*by L. M. Vaughn & L. S. Hardin* $2.96
The application of efficiency studies to farm work.

Success on the Small Farm—*by Haydn S. Pearson* $4.00
Subject—how to net $3,000 a year on 10 to 12 acres.

The Farmer's Handbook—*by John M. White* $4.95
Easy reference book on crops, livestock, and farm problems.

A Dutch Fork Farm Boy—*by J. M. Eleazer* $3.50
South Carolina farming a half-century ago.

The New Joy of Cooking—*by Rombauer and Becker* $3.95
This will be the most used book in the farm home.

Soil and Crops

Soil Conditions and Plant Growth—*by E. J. and E. W. Russell* $8.75
An English classic on the chemistry, structure, and life of the soil.

The Pasture Book—*by W. R. Thompson* $3.50
Revised edition, the 8th since 1949, of this information-packed book

Principles of Field Crop Production—*by Martin & Leonard* $6.00
A new book covering the growing of every major farm crop.

Forages—*edited by Hughes, Heath, & Metcalfe* $6.75
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Soils and Fertilizers—*by Firman E. Bear* $4.50
An understandable book on the complex subject of fertility.

Using and Managing Soils—*by A. F. Gustafson* $3.20
Fertility, rotation, drainage, erosion tillage are covered.

Hunger Signs In Crops—*A Symposium* $4.50
How to diagnose fertility needs from the plants themselves.

Production of Field Crops—*by Hutcheson, Wolf & Kipps* $5.00
A new edition makes this the latest work on American field crops.

Irrigated Soils—*by Thorne and Peterson* $5.00
The practice of irrigation and the management of irrigated soils.

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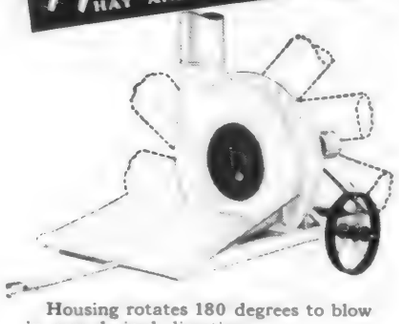

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ARTIFICIAL INSEMINATION

(*Continued from page* 124)

degree of fertility after it thawed. The semen, with the glycerine type diluter, has been stored for only a day or so after freezing. However, it is believed that in this state it can be held indefinitely. Alert to the possibilities of their new finding, the British scientists have continued their studies. As yet they have not reached the point where they are willing to make recommendations as to the long time storage and use of frozen semen.

With the demonstration by these scientists that calves can be produced from frozen semen, it is only a matter of time until the methods will be tested and refined to the point where long storage of semen and the use of semen banks will be a routine practice. This will revolutionize the whole artificial breeding program. Since over 50 per cent of all semen is wasted today because it cannot be used before it gets too old, the usefulness of each bull will be increased nine or ten fold when the semen can all be held in storage until it is ready for use. Breeders will be able to decide which bull they want bred to their cows. They will be able to plan their whole breeding program, linebreeding or outcrossing mating systems, knowing that the semen is available. They will even be able to breed to a particular bull for some time after his death.

By making it possible to hold semen for long periods of time, this new discovery may well change the organizational setup of the breeding associations. Instead of many scattered associations located throughout the country for quick delivery of semen, there may be a pooling of bulls to form a few very large associations. The inseminator technician or even the farmer himself may secure semen far in advance of his needs and hold it in refrigerated storage. With the saving of semen and the elimination of the need for rapid daily delivery, the cost of the program will be reduced at the same time that its value is increased.

Has Artificial Insemination Raised Production?

Probably the most important question is, are we improving our dairy cattle? Are we increasing milk and butterfat production? The answer is not easily come by. The problem involved in studying the genetics of millions of cattle on artificial insemination is exceedingly complicated and requires the best brains in the country for a solution. We must have facts to show whether or not we are improving our cow population.

Where are the records which will give us the answer? Not over five per cent of the nation's cows are on production testing and only about 12 per cent of *these cows* are being bred artificially. This gives us a small sampling of a very small sampling to go by. Studying the records of 21,267 daughters of 1,165 sires used in

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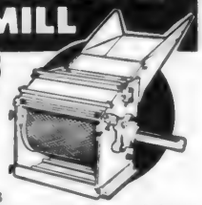

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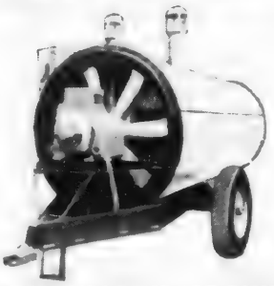

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artificial insemination, shows that there is some difference between these and the ordinary cow on D.H.I.A. test. But the difference is much less than most people think. These cows are the best cared for, highest producing cows in the country.

How about the lowly cow giving 200 pounds of butterfat a year? Have her daughters been improved by artificial insemination? Records here are scarcer than upper teeth in a cow, for the farmer who keeps the poor producer is not the one who joins D.H.I.A., or keeps accurate records of his own. The national production, however, has been increasing year after year and has been accelerating in the last few years. We feel that a considerable proportion of this recent increase must be attributed to an improvement in productive capacity bred into the cows by the good blood lines used in artificial insemination.

The challenge today is to use artificial insemination to the fullest to improve the rank and file of the nation's herd of milk cows. To do this we must continue to improve our bull studs.

Finding New Bulls

In the beginning the artificial insemination associations raided the bull rings and the private breeders for proven sires for the studs. They got their bulls, but they reduced their future supply, for the bull ring members joined the artificial breeding association and so did some of the purebred breeders. Now the associations must get out and start proving young bulls themselves.

By sampling such bulls on a limited number of cows in the program, withholding the bulls from service until proof of them can be obtained from their daughters, and then, selecting only those with the highest proof for extensive use, the artificial breeding units can be assured of making good progress.

Today several of the associations are beginning to tackle this problem. In general, three methods of proving a bull are being used. One is to use a bull enough to insure 50 daughters reaching maturity. Wherever possible this method is used in herds on D.H.I.A. test so that a comparison of dam and daughter can be made. A second method is to put the young bull into a single herd and transfer him at the end of a year into a second herd. This method almost duplicates the old bull ring method of discovering proven sires. A third method is to use the bull in artificial insemination, then buy up a group of his daughters and test them under known, standard conditions and later sell them. This third method envisages using these daughters later for testing other bulls since their records are known and the conditions under which the records were made are also known. In each case, of course, the young bull would be carefully selected from among the highest producing families available.

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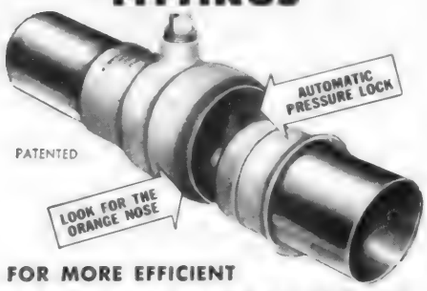

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Such programs will be expensive and will require a great deal of information which is not now available. Artificial breeding units must begin to dig out the basic information from which scientists can deduce the facts needed to make the bull selection program effective. In order to uncover this information they will have to expand the testing programs. The units will have to invest in science if they are to meet the demand for increased production which science has offered through the technique of artificial insemination.

Here are five things farmers can do to make artificial insemination do a better job for them:

1. Give the cow a 60-day rest after calving before rebreeding. 2. Keep records of when cows come in heat. 3. Watch for heat signs at all times, since cows can be quite irregular, but particularly 18 to 25 days after last heat. 4. Notify the inseminator technician immediately when a cow comes in heat. 5. Call in a veterinarian to examine cows which have been bred three times without conception.

Here are three ways artificial insemination associations can help to improve the whole program:

1. Continue to search for improved techniques and to insist on conscientious work from the inseminator technicians. 2. Begin testing low to average herds to supplement the D. H. I. A. records now available. 3. Establish bull-proving programs to supply the future need for bulls which can sire high producing daughters.

THE AUTHORS: G. W. Salisbury is Head of the Department of Dairy Science at the University of Illinois. Recognized as one of the outstanding authorities in the world on Artificial Insemination he set up a program in Greece in 1946. In 1950 he reviewed the program in Great Britain at the request of the British Milk Marketing Board. N. L. Van Demark is an Associate Professor in Dairy Science at the University of Illinois. During the summer of 1952 he surveyed artificial insemination work in Europe after presenting a paper in London.

ACCURATE FARM ACCOUNTS

(*Continued from page 71*)

cash basis may be as satisfactory as the accrual basis. Harry Olson was on the cash basis when he set up his new bookkeeping system. Since his income was relatively steady he decided to stay on the cash basis rather than go to the trouble of changing over.

Cash Receipts and Disbursements Basis

When the cash basis is used, farm income includes all cash or value of merchandise or other property received during the taxable year. It does not include the value of products sold or services performed for which payment was not received during the taxable year. Income includes receipts from: 1. The sale of all items produced on the farm, and 2. Profits from the sale of livestock and other items which have been purchased and resold, aside from sales which can be treated as capital assets. It is important to keep records of purchases of animals made in years past.

Allowable deductions include those

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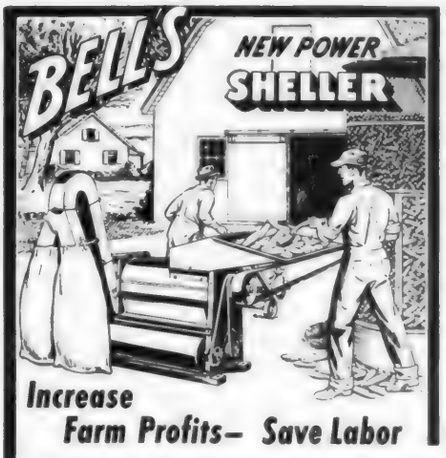

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business expenses which were paid during the year regardless of when they were incurred. A cow of Olson's was treated for mastitis in December of 1951, but the bill for the work was not received and paid until January of 1952—on the cash basis, this was a 1952 expense. Other allowable deductions include depreciation on depreciable items.

The difference between a business expense which is deductible and a capital investment which can only be deducted as it depreciates is often a subtle one. There can be no question about a new building or a new tractor being a capital investment or that the farm labor costs and the gas and oil to operate the tractor are business expenses. Painting the barn, however, might be considered either an expense and deducted at once or a capital investment and depreciated over a five year period; and the question of whether a fence was repaired or replaced is one that often can be settled only between the farmer and his Maker.

When filing returns on the cash basis, the use of Form 1040F is required in computing net farm profits.

The advantage of the cash basis is that it is the simplest form of tax reporting if cash income and expenses do not vary greatly from year to year in ordinary years. The major disadvantage is that if a farmer raises crops which are not sold in the year in which they were raised, he will be reporting the production expenses one year and the income from the crop the next. This might well give him a much higher tax rate than if he could report the crop expenses at the same time he reports the income from it.

Accrual Basis

When the accrual basis is used, farm income includes all income earned during the taxable year from the sales made during that year regardless of when payment is received. In addition, it includes increases of inventory values of livestock, crops, feeds, produce, and the like at the end of the year compared to the beginning of the year. A bred heifer, for example, which was listed on the inventory at $200.00 in 1951, freshened during the year and increased in value to $250.00 and added a heifer calf to the herd which the farmer valued at $50.00; all of which added $100.00 of taxable income to the inventory.

Complete inventories of livestock, crops, produce, feed, and supplies are required for reporting on the accrual basis. They are not required for the cash basis though most farmers will want to keep an inventory for their own use.

The problem of assigning a value to livestock, crops, and other items on the inventory may be solved in any of the following ways. 1. The farmer may use actual costs or production costs as the value of his products. 2. The lower figure when comparing the production costs with the market price. 3. The farm price

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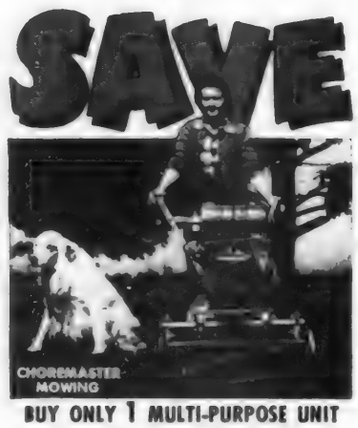

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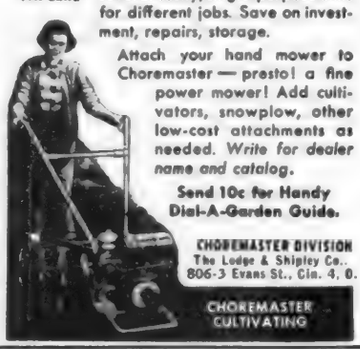

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method which is based on the selling price of the crops or livestock less the direct cost of selling. This is the easiest and most popular of these methods of assigning value. 4. The unit-livestock-price method which consists of assigning a value to each class of livestock, such as calves, yearlings, two-year-olds, and mature animals, and figuring each animal in the class as being worth the same. All of the items on the inventory must be figured on the same basis except that, with the permission of the Treasury, a farmer may use the farm price method for all items except livestock and use the unit-livestock-price method for them.

A record of all farm business receipts and expenditures, together with a list of all depreciable items and a record of annual depreciation is essential for tax reporting on either basis. When filing returns on the accrual basis, the use of Form 1040F is optional for computing net farm profit. A copy of the farm business summary may be substituted for Form 1040F.

Gains or losses from the sale of livestock, machinery, or other items that can be treated as the sales of capital assets are not to be reported as a part of the farm income in either system of accounting and should not be entered on Form 1040F. Such gains or losses should be entered in Schedule D of Form 1040.

The advantages of the accrual basis of tax reporting are: 1. This method most nearly reflects the true farm income for each year. 2. Higher taxation is avoided whenever two years' crops are sold in one year. 3. Income on livestock is reported in the year the animals are raised rather than in a lump when they are sold. 4. Expenses are deductible in the year in which they are incurred and not in the year in which they are paid. This last can also be a disadvantage under some circumstances. The major disadvantages of this system are: 1. The records needed are time consuming. 2. Some farmers do not want complete records or lack the persistence or sustained effort necessary to keep such records.

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The 1951 Revenue Act has clarified the treatment of certain sales of breeding, dairy, or work stock as capital gains or losses, to allow all such sales if they meet only the following two conditions: 1. Owned for 12 months or more (as compared to six months for capital assets). 2. Held for breeding, dairy or draft purposes, and not primarily for sale in the ordinary course of the farm business.

"All the effort I have put into bookkeeping through the year is paid off at tax time," Harry Olson said. "I can't rightly say that it has made the income tax a downright pleasure—it hasn't taken a bit of the sting out of it—but it has made it less of a drudgery. What's a lot more important is that I know my farm opera-

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tion a lot better than I did. I know how my costs are running and where I am making money and where I am losing it. Just the process of keeping my books has made me more business-like about running the farm."

THE AUTHOR: Warren H. Dunn is Cashier of the Farmers National Company of Omaha, Nebraska. In this position he handles the accounting for some 1600 farm owners, whose management is handled by the firm. He knows farming first hand, as he owns a 480 acre wheat farm in Nebraska.

THE POLYELECTROLYTES

(*Continued from page* 58)

per acre at the present sales price of Krilium. But it won't be long until production efficiency and competition will take care of the high price.

This type of application, incidentally, seems to be the spot where the use of liquid or soluable conditioners might be of greatest value. Such material can be sprayed on in a precise narrow band affording maximum application efficiency.

American Cyanamid's Aerotil is now being packaged and marketed under various names including Soilife, Terra Kem, Ortho-Til and Du Pont Soil Conditioner W. Its recommended rate of application is 200 pounds per acre to a half-inch depth and it sells for approximately $5 per pound.

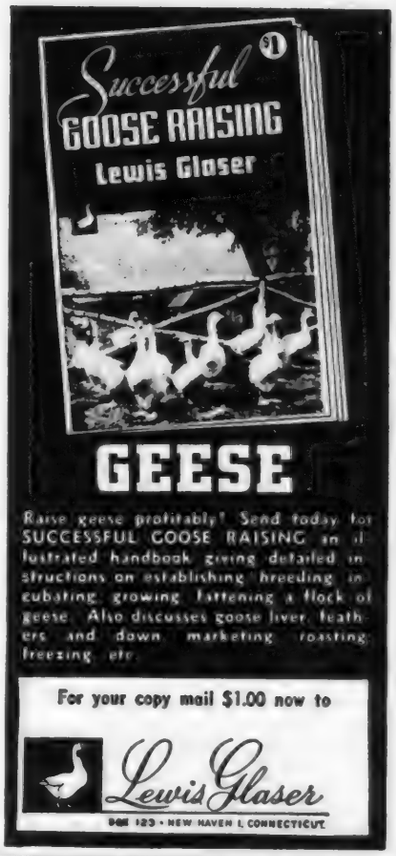
A cheaper one, though we have no data on its performance, might be Fluffium. In liquid form, this conditioner sells for $9.50 per gallon. The gallon is said to treat 1000 square feet to a depth of four to six inches. At that rate it would take about 40 gallons to treat an acre and the cost would run around $380. If this preparation would be effective in a half-inch application, an acre could be treated for less than $50.

Among other conditioners currently on the market are Agrilon, Acrisoil, Poly-Ack, Soiloam, Nu-Soil, Ackril, Agrigair and Loamium. The last two are fortified with a fertilizer.

A word of caution is necessary here. Very little is known about some of these conditioners. However, soil scientists say that the recommended application for them is so slight as to be almost entirely ineffective. The concentration of active hydrolyzed acrylonitrile would determine whether they were effective or not. The experiment stations should have test results out on them soon.

A great deal has already been said about the manner in which Krilium and its associates increase and stabilize the soil aggregates. Specifically, here is Krilium's record on that score. Miami silt loam usually has 20 to 30 per cent water-stable aggregates larger than 0.25 mm. Treatment with 0.1 per cent Krilium under laboratory conditions immediately increases this to as much as 90 to 95 per cent.

Tests at Ohio and other experiment stations show that this improvement in aggregation produces a friable, easily worked soil that is neither as sticky when wet, nor



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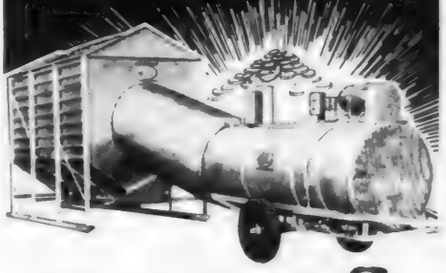

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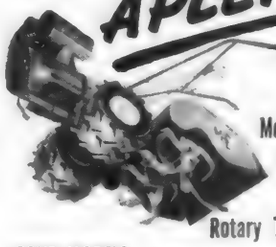

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as hard when dry as untreated soil, and by increasing porosity it brings about better drainage and the increased aeration which goes with it. This is of tremendous benefit. Many soils are definitely limited in their productivity because they suffer from lack of oxygen. If the pores are opened so that the gravitational water can find its way to lower levels both the plant roots and the bacteria which need air will be able to function in conditions to their liking.

This ability to make soil receive water faster and in more abundance also reduces run-off during and immediately after a rainfall and is a factor in controlling loss of top soil from erosion.

It has been found that evaporation from the surface of a treated soil is much slower, possibly as much as 40 per cent slower, than from the surface of a similar soil that has not been treated. What happens here is that the loose, friable surface layer of treated soil is so open that capillary action is stopped. This loose layer acts like a mulch; the surface appears much dryer than would ordinarily be the case and the ground can be satisfactorily tilled when it contains a fairly high percentage of moisture.

One of the greatest advantages offered by the conditioners would seem to be their ability to aid the rapid and effortless emergence of frail young seedlings by preventing the slaking and crusting of the surface soil. This characteristic provides one of the most spectacular of the laboratory demonstrations. The emergence of kidney beans, for instance, from soil that has been treated and watered is practically 100 per cent, whereas in untreated soil the emergence will usually run about one in five. In the treated soil the seedlings come right up through the loose ground with little effort, while in the untreated soil they find themselves butting their heads against a solid wall when they reach the hard, crusted surface. Carried over to field conditions this ability to give seedlings a helping hand should be a real boon to the farmer.

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Erosion control is a problem that has received very special attention from the Monsanto people and their progress here has definitely passed the experimental stage. In treating road banks and slopes a mixture of Krilium, seed and fertilizer is sprayed directly on to the soil. The conditioner forms a film that permits water to pass through into the soil and permits the seedlings to sprout without difficulty while holding the soil as firmly as if a tarpaulin had been thrown over it. A pound of Krilium per 100 square feet (about 400 pounds per acre) will do the job of a straw mulch applied at the rate of two to four tons per acre. But experience is showing in some cases that on spring seedings the best results are still obtained if a straw mulch is used with the Krilium. The straw provides the neces-

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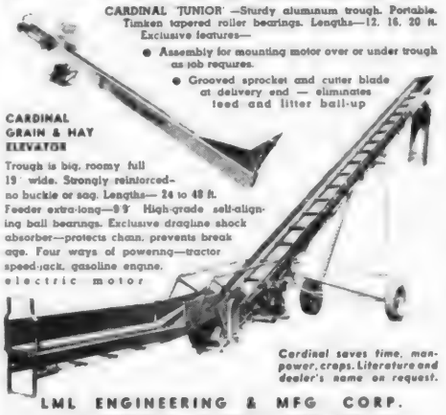

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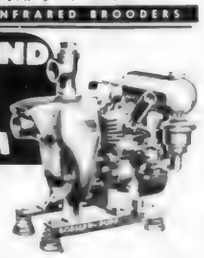

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Crop Yields

The payoff with the soil conditioners as with any device introduced into farming is in crop yields. Unfortunately, we can't take you to a farmer and say, "here's a man who has tried the stuff; this is what he has to say about it." But the experiment stations have had some results that look interesting. For instance, Ohio State got an increase of 40 per cent on oats planted as a nurse crop for alfalfa. Field corn yields were upped 15 bushels per acre while carrots responded with a 21 percent increase. Though potatoes and sugar beets showed little improvement in the treated soil they did dig easier and came out of the ground cleaner. All of these crops were grown on soils treated with as little as 400 pounds of Monsanto's CRD-186 to the acre.

The artificial soil conditioners are so new and have hit the agricultural industry with such a surprising impact that little criticism of them has developed as yet. Obviously, the first rejoinder of any prospective user is going to be on price. That is a matter that only time and efficiency can remedy. But you can be absolutely certain that the price will come down, but fast, once the demand is enough to drive production into high gear. And if the thousands of daily inquiries addressed to the manufacturers are any indication, it looks like public acceptance is going to be widespread.

The conditioners won't work on all kinds of soil, nor are they adapted to every planting process. For instance, down at the Kentucky Experiment Station they tried Krilium on some tobacco plant beds this spring. To start with, the beds probably didn't need any conditioner because that Maury silt loam of the central blue grass region is just one mighty nice soil, and when those fellows get through working over a plant bed it's ready to raise anything. To test it they worked a pound of Krilium into 100 square feet of each of two plant beds to a depth of two to three inches. On one of the beds where dry weather followed treatment and surface seeding they got a stand only two-thirds as good as on the untreated portion. On the other bed, where rains came between treatment and seeding, the stand was as good but no better than the adjoining section. J. F. Freeman, superintendent of the University farm, says he thinks the conditioner kept the soil too open on the first bed allowing more of the tobacco seedlings to perish during a dry spell.

That is the story of the artificial soil conditioners up to this moment. Developments are coming so fast, though, that it is like the weather in some parts—if you don't like it, just wait a minute.

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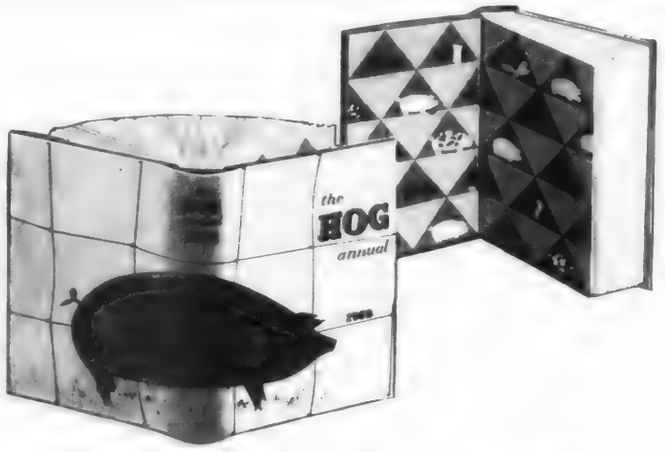

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ATROPHIC RHINITIS

(*Continued from page* 66)

against it, for no form of treatment can be recommended at this time. Instead, certain management practices are much more desirable when this disease appears on a farm. Whenever possible, every last pig should be sold and the hog business abandoned completely for three or four months. After thoroughly disinfecting feeders and other equipment, you can try it again with a batch of clean pigs started out on ground not used by swine for several years.

If you're in the purebred business and don't feel able to sell the entire herd, you can follow a slightly different program. Animals showing symptoms might as well be sold, of course, for they'll probably never be much good to you, anyway. Besides, keeping them around will give them a chance to infect other pigs.

With suspicious animals off the place, it'll be a good idea to separate the sows a week before farrowing time and keep them apart for a month or six weeks afterward. Pigs should be watched closely all through this isolation period and any that show signs of sniffling or sneezing should be immediately removed and either killed or raised as orphans. Sows farrowing such pigs should be considered as likely carriers and marketed as soon as practical after pigs are weaned.

The pigs should be watched even after weaning, and any that show evidence of dished or crooked noses should be sent to the stockyards. To be on the safe side you'd better not save any litter mates of such animals for breeding purposes, either.

At the end of the season when you've disposed of all suspicious-looking porkers, you'll do well to disinfect all houses, feeders, waterers, and other equipment that they've used at any time. Mudholes and wet spots should be drained or filled in, and pastures should be rotated.

If you don't run across atrophic rhinitis on your farm, we're pretty sure that you'll want to keep it off the place. In that case you'll have to be pretty careful where you buy breeding stock or feeder pigs, or you'll stand a good chance of bringing the disease with them.

There is danger even when you go on farms to buy directly from owners, for the disease may exist anyplace that hogs are kept. Sometimes it's recognized and sometimes it isn't, but there's always a chance you'll pick up a carrier animal if you aren't careful. Accordingly, if you don't know an owner pretty well as an honest man and can't see the porkers on his home place, you'd better not buy any breeding stock from him. Regardless of who he is, you'd better not buy any of his animals which have been "loaned out" around the country.

THE AUTHOR: Dr. Jack Bailey is a veterinarian practicing in Wisconsin, the dairyland of American. Born and reared on a farm in the same state, he has been interested in hogs and all farm animals. He is a graduate of the Veterinary College at Cornell University.

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Your Cost Per Ton is LESS with a PAPEC

A Papec Forage Harvester has features not found in other harvesters which enable it to handle all forage crops faster, easier and cheaper

Handles both hay and row crops . . . full 52" width hay pick-up . . . patented silage shelf on row-crop attachment gives more capacity . . . axles individually adjustable backward, forward, up and down for row ridge clearance and balance . . . adjustable hay pick-up fingers . . . bigger wheels and tires for easier draft . . . and Papecs handle down and tangled crops which other harvesters can't cut.

Yet with all these features, pound for pound a Papec Forage Harvester costs less than other makes.

The HAMMER MILL with the IRON-CLAD GUARANTEE

Papec Hammer Mills are in a class by themselves. Every Papec Mill is GUARANTEED to grind *any* dry feed to *any* desired fineness FASTER and CHEAPER than *any* other mill in the same power class.

For complete information on Papec Forage Harvesters or Papec Hammer Mills, see your Papec dealer or write us for FREE BOOKLETS. Papec Machine Co., 119 East Main Street, Shortsville, New York.

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FORAGE HARVESTERS • HAY CHOPPER-SILO FILLERS • CROP BLOWERS • HAMMER MILLS • ENSILAGE CUTTERS • FEED MIXERS

365 Reasons Why RIGHT NOW is the Time to Get that ROTOTILLER!

Trade Mark Reg. U. S. Pat. Office

DOES ALL THESE JOBS WITH EASE
Switch Lightning-Change Attachments in Seconds

JANUARY (Snowplow)—You can easily move as much snow as eight men with shovels! Can also be used as a light bulldozer!

FEBRUARY (Generator)—When power fails your ROTOTILLER Electricity Generator keeps freezer, furnace, pump and lights going!

MARCH (Fire-fighting) — Water Pump is ready to fight fire, pump out flooded cellar, irrigate lawn, spray garden and orchards.

APRIL (Tilling Garden)—Goodbye plow, disc and harrow! With your ROTOTILLER you can prepare ideal seedbed all in one operation!

MAY (Power Wheel Barrow)—and all year 'round—what a joy is this rugged Power Wheel Barrow! Practically no work at all!

JUNE (Cultivating Grapes) — ROTOTILLER is the handiest, most scientifically designed machine ever built for cultivating.

JULY (Lawn Mowing) — Lawn Mowing lasts all season long. ROTOTILLER'S Lawn Mowing attachment is famous for ease and performance! Leaves no untrimmed edges!

AUGUST (Mulch Mowing) — From early Spring to late Fall no easier way to mow weeds than with new, low-cost Rotary Mower attachment! It's a dream!

SEPTEMBER (Lawn Making)—Rototilling is the experts' way to make new lawns and remake old ones in Spring and Fall. Roll it and grade it with a ROTOTILLER.

OCTOBER (Power Composting Leaves) — Power Composting leaves is only one of many ways you can improve your soil from earliest Spring right into late Fall!

NOVEMBER (Sawing Fire Wood) — Cut timber, pulp wood, firewood, fence posts with ROTOTILLER'S new Electric Generator Chain Saw.

DECEMBER (Greenhouse Interior) — Greenhouse operators the world over use ROTOTILLERS. It's a year-'round money-maker.

RIGHT NOW — This Month — This Week — ANY Day of the Year — Your *Lightning Change* ROTOTILLER CAN Save You Time, Work and Money!

A ROTOTILLER is *not* just the best *gardening* machine on the market! It is that, all right — but, with its many low-cost Lightning-Change attachments it can do dozens of other jobs equally well.

It has so many practical uses it can easily be worth $3.00 to $5.00 an hour to you *any day in the year!*

That's why we say, "If you want a ROTOTILLER at all—you want it NOW!" Once you have a ROTOTILLER you'd no more want to be without it *any time of year* than you'd want to be without your refrigerator or your automobile!

For Example—Take Any Day At All

Take a day in October . . . *any day!* You can make yourself at least $3.00 an hour improving the fertility of your garden — gathering leaves in the big POWER WHEEL BARROW attachment — working them into the soil with the ROTOTILLER attachment. Or you could make yourself more than $5.00 an hour felling and sawing firewood with ROTOTILLER'S 1,000 watt, 115 volt, A. C. generator attachment operating ROTOTILLER'S Electric Chain Saw! (And if your public power fails during a storm, this same generator will keep your freezer, furnace, water pump going and also some lights!)

Again, in October with your ROTOTILLER you could be preparing new ground for more garden or lawn next year. You could be seeding down a Winter cover crop to work into the soil next year. You could be building a stone wall — using the Power Wheel Barrow attachment — and running a small cement mixer, using your ROTOTILLER for power. You could be grinding up old weeds, hay, etc. to mulch your garden, flowers, shrubs, for soil improvement and Winter protection.

ROTOTILLER'S wonderful, new Electricity Generator attachment operates ROTOTILLER'S Electric Chain Saw; many other labor-saving electric appliances.

When It Comes to Spring and Summer!

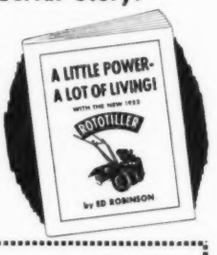
When it comes to Spring and Summer there's just no other garden tractor built that compares with your ROTOTILLER! It plows and harrows your garden in one unbelievably quick and easy operation! Then it cultivates with far less damage to plant roots than ordinary drag-tooth cultivators!

Your ROTOTILLER is such a marvelously efficient gardening machine, you can grow hundreds of dollars worth of vegetables and flowers to use or sell with only a few *hours'* work! For making new lawns, for remaking old lawns, ROTOTILLER is way out ahead, too—used by practically all commercial landscape gardeners. Every bit of lawn at the New York World's Fair was made with ROTOTILLERS!

Is it any wonder we say there are 365 reasons for getting *your* ROTOTILLER NOW? For 365 days a year it can make you $3.00 to $5.00 an hour.

MAIL COUPON FOR FREE BOOK
It Tells You The Whole Wonderful Story!

And that's not **all** the good news either! ROTOTILLER and its Lightning-Change attachments **cost less!** You'll be amazed and delighted at how little they cost! There just isn't room in even this big advertisement to give you the whole wonderful story of the new Lightning-Change ROTOTILLER, its attachments, and what they will do for you. That's why we would like to send you our big, completely illustrated 68-page BOOK, entitled "A Little Power—A Lot of Living," by Ed Robinson, author of the famous "Have-More" Plan. It is absolutely FREE! No obligation. Just mail the coupon for your copy by return mail! **Rototiller, Inc., Dept. 910, Troy, N. Y.**



ROTOTILLER, Inc.
Dept. 910, Troy, New York

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"If You Want a ROTOTILLER at all—YOU WANT IT NOW!"

with buildings that build profits

Grandpa's big red barn seemed great stuff in its day . . . but we know better now. With operating costs climbing and competition ever keener, profitable farming today demands the most efficient facilities.

That's why Martin Steel-Bilt Buildings belong in *your* farming picture. For these sturdy structures offer far more than just storage and shelter. They're basic farm equipment—developed, designed and engineered by agricultural specialists—to help you make the most of every crop you harvest, every head of stock you raise.

There's the famous Haymaker that provides "pasture fresh" feed throughout the year . . . to promote thriftiest milk and meat production. The same holds good for the unique, self-feeding Haymaker and the multi-featured Martin Silo. There are corn cribs and grain bins adaptable for crop drying; corn-saving slat-walled cribs and labor-saving stanchion barns; arch-type buildings – all completely fireproof, ratproof and weatherproof—all built by Martin to outlast your longest estimate. *All profit-builders you can't afford to overlook.* Mail coupon for the full facts!

FREE ILLUSTRATED FOLDERS
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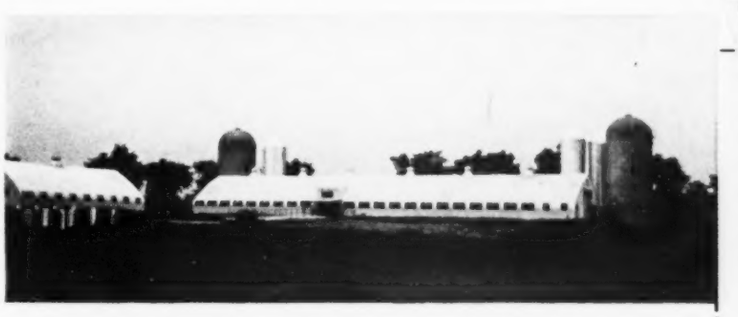

Martin Steel-Bilt Buildings are keyed to the needs of modern farm practices—permanently beautiful and efficient—profit-making equipment that pays for itself many times over in labor savings alone.

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MINNEAPOLIS-MOLINE

MM

MODERN MACHINERY

IN YOUR HANDS!

MM HUSKORS help you GET ALL YOUR CORN!

COSTS HALF AS MUCH!

in terms of number of hogs or bushels of corn, MM Huskors cost only about half as much as in 1939.

Here's efficient harvesting at its low-cost best. Pick, husk and clean up to 25 acres a day with the MM 2-row Huskor.

with LONGER PICKING ROLLS ...MORE HUSKING ROLLS

Did you ever cup your hands and see the M's that form in each palm? That's your *profit line!* Double M's for Minneapolis-Moline . . . for *More Money* from the land you farm.

Put *your* profit line to work for you. Pick, husk, and clean up to 25 acres of corn a day with MM 2-row Huskor, up to 13 acres a day with the MM 1-row Huskor. Do a faster, easier, smoother job. Husk more acres per day . . . cut your labor costs with greater MM Huskor capacity. Get ALL YOUR CORN!

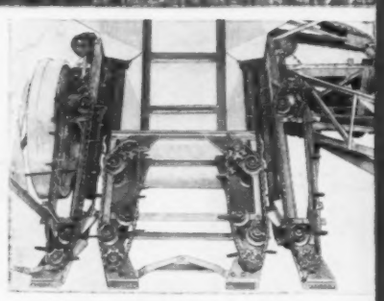
GET THE DOWN STALKS, TOO!
MM picker action gives you whole, clean ears, practically *eliminates* shelling in the field. Five-position floating snouts guide even the strung-out, down stalks into gathering chains, (6 on 2-row, 3 on 1-row machines).

LONGER SNAPPING ROLLS GET THE HIGH EARS AND THE LOW EARS.
Extra long, 53½-inch, MM snapping rolls give you greater picking efficiency. Only the lower 18 inches are grooved to prevent shelling in the field. Snapped ears automatically fall into elevator. Spring-operated stop prevents snapped corn from falling to the ground.

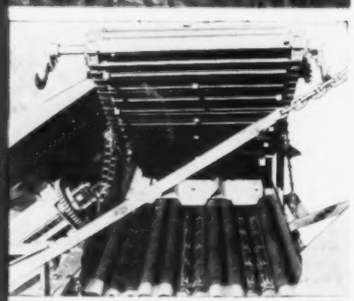
MORE HUSKING ROLLS FOR GREATER CAPACITY, BETTER CLEANING.
Full-length metal-and-rubber Huskor rolls husk *faster*, do a *better* job under all husking conditions; (12 rolls 36-inches long on the 2-row—6 metal and 6 rubber . . . 8 rolls 36-inches long on the 1-row—4 metal and 4 rubber). Adjustable feeder apron above the husking bed.

SEE YOUR MM DEALER
Ask your MM Dealer to show you how MM Uni-Matic system gives you hydraulic control of picking height, how power take-off drive gears operate in continuous oil bath. Have him show you the sealed roller and thrust bearings on all principal drives . . . how you can adjust the elevator spout of the wagon box elevator right from the tractor seat to keep loads evenly distributed.

Your MM Dealer has *all* the facts on profit-boosting, cost-cutting MM Huskors. Visit him and see why MM Huskors are SELLOUTS EVERY YEAR!



LONGER SNAPPING ROLLS on MM Huskors help you get all your crop, high ears and low ears. Five position floating snouts guide even down stalks into gathering chains.



MORE HUSKING ROLLS of metal and rubber give you greater capacity, let you pull your Huskor faster, give you a cleaner crop. Costs go down . . . Profits UP.

Farmer-owners report harvesting *more than* an acre an hour with the big-capacity single-row MM Huskor.

Coming or going, you're corn costs you less, profits go up—when you harvest with an MM Huskor.

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